

CONSERVATION DISTRICT USE APPLICATION (CDUA)

All permit applications shall be prepared pursuant to HAR 13-5-31

File No.:

Acceptance Date:

180-Day Expiration Date:

Assigned Planner:

for DLNR Use

PROJECT NAME Holcomb Residence

Conservation District Subzone: Resource

Identified Land Use: HAR Section 13-5-24 - R-7 - Single-Family Dwelling, Landscaping and Invasive Tree Removal

(Identified Land Uses are found in Hawai'i Administrative Rules (HAR) §13-5-22 through §13-5-25)

Project Address: 28-3426 Hawaii Belt Road, Honouliuli, Hawaii 96728

Tax Map Key(s): 2-8-012:028

Ahupua'a: Malamalamaiki 2

District: South Hilo

County: Hawaii

Island: Hawaii

Proposed Commencement Date:

Proposed Completion Date:

Estimated Project Cost: \$484,425

TYPE OF PERMIT SOUGHT ☒ Board Permit ☐ Departmental Permit

ATTACHMENTS

\$ 2,500 Application Fee. 2.5% of project cost for Board Permits, but no less than \$250, up to a maximum of \$2500; \$250 for Departmental Permits (ref §13-5-32 through 34).

\$ _____ Public Hearing Fee (\$250 plus publication costs; ref §13-5-40)

- ☒ 20 copies of CDUA (5 hard + 15 hard or digital copies)
- ☒ Draft / Final Environmental Assessment (EA) or Draft / Final Environmental Impact Statement (EIS) or Statement of Exemption
- ☐ State Historic Preservation Division HRS 6E Submittal Form (dlnr.hawaii.gov/shpd/review-compliance/forms)
- ☐ Management Plan or Comprehensive Management Plan (ref §13-5-39) if required
- ☐ Special Management Area Determination (ref Hawai'i Revised Statutes 205A)
- ☐ Shoreline Certification (ref §13-5-31(a)(8)) if land use is subject to coastal hazards.
- ☐ Kuleana documentation (ref §13-5-31(f)) if applying for a non-conforming kuleana use.
- ☐ Boundary Determination (ref §13-5-17) if land use lies within 50 feet of a subzone boundary.

REQUIRED SIGNATURES

Applicant

Name: Kelly Holcomb, Trustee of the Holcomb Family Trust

Title; Agency:

Mailing Address: 3857 Birch Street, PMB 1833
Newport Beach, CA 92660 2616

Contact Person & Title: Steven S.C. Lim, Esq.(Partner) & Jason Knable (Paralegal) at Carlsmith Ball, LLP

Phone: 808-935-6644

Email: jknable@carlsmith.com

Interest in Property: Owner.

Signature:  Date: 6/3/21

Signed by an authorized officer if for a Corporation, Partnership, Agency or Organization

Landowner (if different than the applicant)

Name:

Title; Agency:

Mailing Address:

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Phone:

Email:

Signature: _____ Date: _____

For State and public lands, the State of Hawai'i or government entity with management control over the parcel shall sign as landowner.

Agent or Consultant

Agency: Carlsmith Ball, LLP

Contact Person & Title: Steven S.C. Lim, Esq.(Partner) & Jason Knable (Paralegal) at Carlsmith Ball, LLP

Mailing Address: 121 Waiuanue Avenue,
Hilo, Hawaii 96720

Phone: 808-935-6644

Email: jknable@carlsmith.com

Signature:  Date: 6/3/21

For DLNR Managed Lands

State of Hawai'i

Chairperson, Board of Land and Natural Resources

State of Hawai'i

Department of Land and Natural Resources

P.O. Box 621

Honolulu, Hawai'i 96809-0621

Signature: _____ **Date:** _____

PROPOSED USE

Total size/area of proposed use (indicate in acres or sq. ft.): 6.485 acres / 42,910 sq.ft.

Please provide a detailed description of the proposed land use(s) in its entirety. Information should describe what the proposed use is; the need and purpose for the proposed use; the size of the proposed use (provide dimensions and quantities of materials); and how the work for the proposed use will be done (methodology). If there are multiple components to a project, please answer the above for each component. Also include information regarding secondary improvements including, but not limited to, grading and grubbing, placement of accessory equipment, installation of utilities, roads, driveways, fences, landscaping, etc.

Attach any and all associated plans such as a location map, site plan, floor plan, elevations, and landscaping plans drawn to scale (*ref §13-5-31*).

The Applicant is proposing to construct a single-family dwelling and accessory uses, including landscaping and invasive tree removal, on a 6.485-acre oceanfront lot located in the State Land Use Conservation District, which is specifically located at TMK: (3) 2-8-012:028 (the "Property") (See "Exhibit A" - Property Location Map). The Total Development Area (TDA) for the subject dwelling and accessory uses is approximately 4,877 square feet, which is in compliance with Hawaii Administrative Rules ("HAR"), Chapter 13-5, Exhibit 4 (Single-family Residential Standards - August 12, 2011). The following will provide a description of the proposed uses.

Single-Family Dwelling: The Applicant is proposing to construct a 4,447 sq.ft. one-story single-family residential dwelling with a maximum height of 21 feet above existing grade, built upon a concrete slab, generally located near the center of the Property. This single-family dwelling will consist of 3-bedrooms and 3-1/2 baths, kitchen, pantry, dining room, living room, and laundry room, comprising of approximately 3,018 square feet in interior living area. The dwelling includes a covered lanai area of approximately 711 square feet in size, an entry and landing of approximately 88 square feet, a 2-car enclosed garage and utility room of approximately 630 square feet, and a below grade swimming pool approximately 364 square feet in size. The Applicant will also install 50 feet of concrete pavers with permeable cinder joints at the exterior exits to the utility room and master shower of the dwelling to facilitate access to the outside (See "Exhibit B" - Overall Site Plan, Floor Plan, Sections, and Elevations).

The subject dwelling will be off-grid (with the exception of hardline telephone service) and will be supported by utilities installed adjacent to and conveyed underground to the dwelling. A roof top photovoltaic ("PV") system with an estimated load of 36 kw/hr/day will provide the electrical needs for the dwelling. The PV power will be stored within batteries with a storage capacity of 32.4 kwh, and will be located in the utility room of the dwelling. The Applicant is also proposing to install a 3-foot tall generator set upon a 12 square foot concrete utility pad along the northeast of the garage entry to provide necessary backup power for the dwelling.

A private water well and pump system will provide potable water for the dwelling and will be housed in a 6-foot tall, 6-foot by 6-foot wide shed, set upon a 36 square foot concrete utility pad, situated adjacent to the generator. The Applicant will apply for the required permits from the State Commission on Water and

Resource Management to drill and operate a private potable well on the Property. Potable water from this well will be delivered to the dwelling through underground piping and will connect to a 500 gallon storage tank located within the dwelling. The Applicant will install a 1.5 horsepower pump capable of delivering up to 50 gallons of water per minute, although the Applicant expects to use less than 300 gallons per day to support the dwelling. The water drawn from this private well will not only supply the necessary domestic uses, but it will also supply the fire sprinkler system planned for within the dwelling for fire suppression in case of emergency. It is also anticipated that very little potable water would be used for irrigation purposes, as there is adequate rainfall in the area to support the proposed landscaping.

The dwelling will also utilize a propane gas system to supply two (2) tankless gas-on-demand water heaters, in addition to other appliances. The Applicant will install a 4-foot tall 500 gallon propane tank set upon a 12 square foot concrete utility pad, located adjacent to the well / pump shed.

An individual wastewater treatment system ("IWS") comprised of a 120 square foot septic tank with a capacity for up to 1,000 gallons, and 390 square foot septic infiltration bed, will provide the necessary wastewater disposal and will meet all applicable County and State regulations. The IWS will be situated along the northwest corner of the dwelling.

Telephone service will be connected to the dwelling via an above ground telephone wire from a utility pole along Highway 19 (Hawaii Belt Road), which will extend into the Property approximately 140 feet to a 12-foot high utility pole. The telephone line will be routed from this utility pole through an underground conduit extending 242 feet to the dwelling. (See "Exhibit C" - Civil Site Plan).

The Applicant is also proposing to install a 4-foot tall perimeter hog wire fence approximately 1,575 linear feet in length within a portion of the Property, primarily to secure the dwelling site. The fencing will be installed without any barbed wire along the top of fence to minimize the potential threat to birds that might otherwise get ensnared on this type of fencing. The Applicant will also install a 4-foot tall metal entry gate over the improved driveway to the dwelling, which is located along a portion of the southeast boundary of the Property.

All structural improvements will be setback from the top of pali as generally depicted on the Overall Site Plan, however, the Applicant will maintain a minimum 130-foot structural setback (with the exception of the installation of the 4-foot tall security fencing surrounding the dwelling).

The Applicant is also planning to provide an at-grade parking area for a maximum of 3 cars just mauka of the driveway and entry gate within the Property for use by the Mākanaloa Fishing Association and its invitees, to access the "Ladders" fishing site, which is located on a peninsula outside of the Property, near the makai (northeast) corner of the Property. Pedestrian access to the Ladders fishing site would generally follow the mauka-makai alignment of the 4-foot tall perimeter hog wire fencing along the Parcel 29 boundary to the shoreline, and the width of this alignment is approximately 6 feet wide. The pedestrian access to the "Ladders" fishing site would continue to follow the makai portion of the 4-foot tall perimeter hog wire fencing and the top of pali towards the northwest, and the width of this alignment is approximately 10 feet wide. These "coastal access corridors" are more fully illustrated on the Overall Site Plan (Ref. "Exhibit B"). The Applicant also plans to install a maximum of 8 informational and warning signs to inform the public of the dangers of the steep coastal sea cliffs and that they are on private property.

Access Driveway: The Property is accessed from A/C paved pull-out located on the makai (northeastern) side of Highway 19 (Hawaii Belt Road) near the 12-mile marker. (See Exhibit "D" - Property Access off Highway 19). Once off Highway 19, access to the Property is over a 0.300-acre road access easement located on TMK: (3) 2-8-012:029 ("Parcel 29"), which is shared by multiple properties. Access to the Property continues to the northwest over a compacted gravel roadway that generally follows the alignment of the old Cane Haul Road, which was used by former sugar cane companies when they cultivated sugar cane in the region. This roadway segment within Parcel 29 is approximately 725 feet in length and fully contained within a 14-foot wide road and utility easement benefitting the Property. The Applicant has no current plans to improve the gravel roadway within Parcel 29. (Ref. "Exhibit B" - Overall Site Plan".

The old Cane Haul Road alignment extends into the Property from Parcel 29 and curves to towards the ocean, terminating near the site of the proposed dwelling. This roadway segment within the Property is approximately 200 feet in length and approximately 14 feet wide. The Applicant plans to improve this section of roadway by grading and installing a concrete driveway from the common boundary of Parcel 29 to the dwelling. The driveway will expand from 14 feet in width to approximately 16 feet in width, as the driveway extends to the dwelling. The Applicant plans to install approximately 898 square feet of concrete pavers with permeable cinder joints at the garage entry, and 3,060 square feet of similar pavers at the driveway turnaround, to connect with the improved driveway. (Ref. "Exhibit B" - Overall Site Plan).

Landscaping: The Applicant will ensure that the existing native plants hala, naupaka and neneleau are preserved and has developed a Landscape Plan featuring native elements, as is encouraged Exhibit 4 of HAR 13-5. The Applicant is proposing the planting of ground cover, small shrubbery, and palms around the perimeter of the dwelling. Native plant species being considered are gardenia nanu, pohinahina, 'akia, hinahina kukahakai, ma'o, naupaka kahakai, nehe, wililwili, 'ilima, a'ali'i and 'ulei. The proposed landscaping is generally depicted and described on the Landscape Plans attached as "Exhibit E". The final landscaping plans, which will depend in part on the availability of planting materials at the time of construction, will be submitted to the OCCL during construction plan approval.

Invasive Tree Removal: The removal of invasive tree species from the Property will occur in 3 zones; the cliffside portions of the Property, the area of the house site near the middle of the Property, and along the common boundary with Parcel 29. (See "Exhibit F" - Tree Removal Aerial and map). No native tree species will be disturbed.

The removal of invasive species along the cliff side portions of the Property would include approximately 48 Ironwood trees approximately 60 to 75 feet in height. There are also approximately 8 other invasive tree species located in this same area, comprised of Macaranga, Bayan and Fiddlewoods, approximately 40 feet to 50 feet in height, which would also be removed.

The Applicant will remove approximately 12 invasive tree species, consisting of Fiddlewood, Tulip and Albizia trees, ranging in from approximately 45 feet to 85 feet in height, in the area where the dwelling will be located.

The invasive tree species to be removed along the common boundary with Parcel 29 consist primarily of Fiddlewood and Guava trees ranging approximately 20 feet to 30 feet in height.

The landscaping activities occurring outside of the dwelling envelop, including the removal of the invasive and non-native trees, would likely occur while the construction activities on the dwelling are occurring. The Applicant's arborist will use a 6-wheel knuckle boom crane truck to assist with the cutting the trees into manageable sections. The crane truck would secure to sections of the trees to allow for proper cutting, and the cut section would be lifted to designated drop zone to allow for dismantling and chipping of the extracted tree section. Use of the crane truck will allow for careful removal of the trees in sensitive areas, such as along the top of pali, will ensure that the cut sections are directed toward the land and not fall towards or into the ocean and will decrease the impacts to the surrounding area, in addition to reducing the overall time needed to remove the trees from the Property. The chipped material generated on site will be repurposed for mulch for use in and around the dwelling and Property. All trees within the Property will be cut to a stump and left in place, and herbicide will be applied to minimize ground disturbances. The planting of native hala along the top of pali will help to further reinforce the stability of the sea cliffs that form the seaward boundary of the Property.

Grading: Nearly the entire Property was in active sugar cane cultivation for over 100 years or was used for portions of the old railroad, flumes or cane haul roads that supported the sugar cane operations in the past. All the areas of proposed ground disturbances for the dwelling, including the house pad, the utility trenching, driveway improvements, and landscaping, will be located in previously disturbed portions of the Property.

The total amount of land being cleared for construction activities would occur over approximately 0.98 acres / 42,689 sq.ft. The proposed grading will consist of approximately 2,000 cubic yards and fill of 2,752 cubic yards to accommodate the natural contours of the land at finish grade, resulting in a balance of cut and fill, so as not to require any importation of additional fill material, consistent with the Compatibility Provisions of HAR, Chapter 13-5, Exhibit 4. Approximately 752 cubic yards of concrete and gravel will be imported to level out the dwelling pad site and associated uses, including the pool, driveway.

The following will summarize the trenching required for single-family dwelling:

Element	Length	Width	Depth	Affected Area	Total Area
Pool	28 ft	16 ft.	6 ft.	448 sq. ft	448 sq. ft
CATV/Telephone	242 ft.	2 ft.	3 ft.	484 sq. ft.	484 sq. ft.
Septic System					
Tank	12 ft.	10 ft.	8 ft.	120 sq. ft.	
Absorb. Field	26 ft.	15 ft.	6 ft.	390 sq. ft.	510 sq.ft.
Sewer Line	(Within Building Pad)				
Water Line	(Within Building Pad)				
Power Line	(Within Building Pad)				

TOTAL AREA: 1,442 sq. ft.

Grading activities within the Property would generally occur at the house pad site and extend outward to cover the driveway turnaround, garage entry, pool, septic system, utilities and driveway and entry gate.

The excavations within the Property would include the pool and septic system, and shallow trenching for the utilities covering approximately 484 sq.ft. The proposed single-family dwelling and associated improvements will be setback no closer than 130 feet from the edge of the top of pali. The closest grading to the top of pali will occur where the septic system will be excavated, which is approximately 80 feet from the top of pali. Silt fencing will be installed along the lower edges of the area proposed for grading to control potential erosion during construction activities. The silt fencing will remain in place until construction activities are completed. Sandbag silt barriers will also be installed, as needed, to control silt runoff. The installation of the perimeter hog wire fencing will not require any grading. (See "Exhibit B" - Overall Site Plan; "Exhibit C" - Civil Site Plan; "Exhibit G"- Grading Plan, Civil Notes and Civil Details).

All grading work will conform to Hawaii County Code, Chapter 10 - Erosion and Sedimentation Control. The contractor will also keep the areas being disturbed and the surrounding areas free of dust nuisances, and the work will be performed in compliance with Air Pollution Control Rules of the State Department of Health, HAR 11-60.1 Fugitive Dust. All grading activities will also be performed in compliance with the applicable provisions of HAR, Title 11, Chapter 55, Water Pollution Control and Chapter 54, Water Quality Standards.

Construction methods: The staging area for all construction activities will occur in an approximately 4,000 sq.ft. area just mauka of the proposed dwelling footprint and the area of the planned driveway turnaround and garden area, which is identified as a gray dashed line on the Overall Site Plan for the Property. (Ref. "Exhibit B" - Overall Site Plan).

The construction activities would commence following the necessary land clearing and grading of the house pad and accessory use areas, including the grading of the garage entry, driveway turnaround and a portion of the existing cane haul road within the Property, in order to create a balanced building area. In order to create a balance of grading cut and fill requirements and level building area, the contractor would import gravel to the site for proper compaction and leveling of the graded areas, and to generally prepare area for the setting of footings and the eventual pouring of the foundations for the structure and the accessory use improvements, including the driveway. The excavations for the pool, sewer system, and all utility trenching, including the 3 drainage sumps, would likely also occur during this stage. Once the footings are installed, concrete would be imported to the site and the foundations would be laid. No concrete truck washout will be allowed on the Property.

Vertical construction would likely commence shortly after the concrete has cured, with the underground utility connections to the dwelling to follow. The pavers for driveway turnaround and the garage entry area would likely be installed towards the end of the vertical construction, along with the landscaping surrounding the dwelling, to avoid construction related impacts to these improvements.

Water for the pool will be provided from the on-site well filtered through the dwelling's water system. The pool water will be chlorinated between 1.0 and 3.0 parts per million, as recommended by the Centers for Disease Control, through an automatic or floater chlorine feeder system to ensure that the pool water is pathogen-free and sanitary while in use. In the event that the pool requires maintenance or repair, and needs to be drained, the chlorine will not be added to the pool for several days before draining, so the pool water can de-chlorinate naturally through evaporation. The de-chlorinated pool water will then be

discharged into the drainage sumps located within the area of the house site and mauka of the pool, at proper flow rates to avoid overburdening the drainage sumps and to allow for efficient dissipation back into the ground.

EXISTING CONDITIONS

Please describe the following, and attach maps, site plans, topo maps, colored photos, and biological or archaeological surveys as appropriate:

Existing access to site:

As discussed in the Proposed Use section above, access to the Property is from Highway 19 via a gravel roadway fully contained within private roadway easements over adjoining Parcel 29.

Existing buildings/structures:

The Property is vacant, therefore, there are no existing buildings or structures located within the Property.

Existing utilities (electrical, communication, gas, drainage, water & wastewater):

There are no existing utilities servicing the Property.

Physiography (geology, topography, & soils):

The oceanfront Property is moderately sloping towards the ocean and located on a bluff approximately 120 to 170 feet above sea. The surface of the Property consists of weathered soils derived from regional ash deposits and alkalic basalt lava flows.

The Property slopes from approximately 185 feet above sea level to 120 feet above sea level, and the sea cliffs located on the 3 sides of the Property range from approximately 50 to 100 feet tall.

The soils within the Property are classified as Hilo hydrous silty clay loam on a 10 to 20 percent slope, according to the U.S. Natural Resources Conservation Service. This type of soil was primarily used for sugarcane cultivation.

Hydrology (surface water, groundwater, coastal waters, & wetlands):

There are no streams, springs or anchialine ponds found within or in the near vicinity of the proposed single-family dwelling or accessory use improvements.

Flora & fauna (indicate if rare or endangered plants and/or animals are present):

According to a Biological Survey prepared by Dr. Ron Terry in August 2020, the Property is primarily dominated with grasses consisting of guinea grass, California grass, and Lyon's grass, in addition to some crabgrasses. The trees species located on the Property are primarily comprised of fiddlewood, common guava, African tulip, and Alexander palms, however, gunpowder, macaranga, albizia, and Chinese banyan are also present. Shrubs are also present on the Property and they consist of Asian melastome, strawberry guava, and night blooming jasmine. A few native neneleau shrubs were also located within the Property. Herbs consisting of rattlepod and Koster's curse were also found within the Property, in addition to the pilau maile vine. Downy wood ferns, sword ferns, warabi, and belchum appendiculatum are also present within Property. There are no uniquely valuable habitats, rare or endangered plant species, or existing or proposed federally designated critical habitats for plants within the Property. (See "Exhibit H" - Biological Survey).

Dr. Terry's August 2020 Biological Survey informed that 8 bird species were observed within the Property with the most common being the Japanese white-eyes, common mynas, and striped doves. Due to the close proximity to the ocean, migratory birds such as the 'ulili, 'akekeke, kolea, and seabird black noddly might be present within the Property, although none were observed. The formerly endangered Hawaiian Hawk, the endangered nene, and the endangered band-rumped storm petrel and Hawaii petrel, threatened Newell's shearwater seabirds were not observed, but could possibly be found within the Property, however, based on existing habitat within the Property, the likelihood that these species would be found within the Property is extremely rare.

Hawaiian hoary bats are likely found within the Property, although none were observed by Dr. Terry. Only one non-native mammal was observed on the Property, which was likely semi-feral pigs. The August 2020 Biological Survey also concluded that small Indian mongooses, mice, rats, cats, and domestic dogs are like present, although none were observed.

Natural hazards (erosion, flooding, tsunami, seismic, etc.):

According to a Coastal Erosion Study prepared by T.E. Scheffler, Ph.D. and J.P. Lockwood, Ph.D., based on the review of available resources covering the last 90 years, the shoreline fronting the Property has been stable, which is likely the result of the stability of the lava flows that formed the shoreline and steep coastal cliffs that comprise the oceanfront boundary of the Property. Despite the stability of the shoreline, the Coastal Erosion Study also informed that there was some observable erosion of the coastal seacliffs that form portions of the Property boundary over the years, however, the changes were negligible and that it was reasonable to conclude that the maximum average annual rate of erosion at 0.15 feet per year was possible. (See "Exhibit I" - Coastal Erosion Study).

For the purposes of meeting the submittal requirements for this Application, and in accordance with the standards of Exhibit 4 of HAR Chapter 13-5, for determining the minimum shoreline setback for a single-family home in the Conservation District, a minimum shoreline setback is determined as 40-feet plus 70 times the average annual coastal erosion rate, as determined by a coastal erosion study. Based on a coastal erosion rate provided from the Coastal Erosion Study of 0.15 ft./yr., the minimum shoreline setback for the Property would need to be at least 50.5-feet (40 ft. plus 70×0.15 ft./yr.). The Coastal Erosion Study also concluded that a 100-foot minimum setback was appropriate considering that large rock falls have apparently occurred to the northeastern and eastern faces bounding the Property. The Applicant is proposing to exceed the minimum shoreline setback required by Exhibit 4 of HAR Chapter 13-5, and the Coastal Erosion Study recommendation, by locating the proposed dwelling no closer than 130 feet to the top of pali. By setting the dwelling back a minimum of 130 feet from the top of pali, this will limit the potential that the proposed dwelling would be subject to coastal erosion during the life of the dwelling.

The Property has also been determined to be located in Flood Zone "X" by the National Flood Insurance Program's Flood Insurance Rate Map ("FIRM") (See "Exhibit J" - FIRM Map). The Flood Zone "X" designation is reserved for areas with minimal flood hazards, including tsunami inundation. The Property is not located within a County of Hawaii Tsunami Evacuation Zone.

The Applicant is proposing a minimum shoreline setback of 130 feet, measured from the top of the pali, and this setback far exceeds the minimum setback calculated based on the DLNR standard and minimum setback recommended by the Coastal Erosion Study. It is for these reasons that there is an ample margin of safety to protect the dwelling and related uses from the potential long-term impacts from coastal erosion at the Property.

Historic & cultural resources:

ASM Affiliates ("ASM") prepared an Archaeological Inventory Survey ("AIS") for the the Property dated September 2020 in accordance with HAR Sections 13-13-283 and 13-13-276. The AIS was approved by the State Historic Preservation Division on November 11, 2021 (See "Exhibit K" - AIS). The fieldwork consisted of a pedestrian transect survey with 100% coverage of the entire Property. The AIS identified a portion of a previously recorded site, namely Site 50-10-26-24212, which was a highly eroded portion of the Hilo Railroad-Hawaii Consolidated Railway bed near the western boundary of the Property, and no other infrastructural elements associated with the railroad were found within site. The AIS also identified a newly recorded site, specifically Site 50-10-26-31238, which is a cut earthen ditch located along the southeastern edge of the Malamalama Gulch near the northern boundary of the Property. This earthen ditch was determined to be a small remnant section of an historic flume that had once traversed the site. This section was also found to be highly eroded and the structural elements that were formally associated with the flume are no longer present. No additional historic preservation work was recommended for either site, and therefore, the recommended determination of effect for the Property was "no historic properties affected".

ASM also prepared a Cultural Impact Assessment ("CIA") dated October 2020 for the Property in compliance with HRS Chapter 343. (See "Exhibit L" - Cultural Impact Assessment). With regard to traditional and customary practices, the parties consulted for the CIA informed that the shoreline was accessed through the Property in the past using methods to rappel down the sea cliffs. Gathering at the shoreline included near-shore marine resources, such as 'opihi, eels, lobsters, turtles, and fish, and freshwater resources from the streams, such as 'opae, 'o'opu, and prawns.

The consulted parties identified the prior use of the "Ladders" fishing site to access the shoreline below the Property. The "Ladders" fishing site consists of a series of dilapidated ladders that descend approximately 100 feet down a steep sea cliff at a peninsula located outside of the Property, near the makai (northeast) corner property boundary. The consulted parties expressed a desire to allow for access to the "Ladders" fishing site to allow for continued subsistence gathering at the shoreline below, despite the dangerous state of the ladder to the shoreline. The consulted parties were also concerned about overuse of the coastal resources and the hazardous situations that could arise from inexperienced users attempting to rappel the steep sea cliffs. Several of the consulted parties expressed a preference that access to the "Ladders" fishing site be managed similarly to other residential developments along the Hamaku'a coast, through a joint-partnership arrangement with the landowner and the area fishing organization.

In order to facilitate lateral pedestrian access to and along the top of the pali fronting the property and to the "Ladders" fishing site, the applicant is proposing two (2) pedestrian coastal access corridors (collectively the "coastal access corridor") (as shown on Exhibits B and C), specifically:

1. A 6-foot wide mauka-makai corridor along the northeastern boundary of the property, roughly 500 feet in length along the common property boundary with Parcel 29; and
2. A 10-foot wide lateral corridor along the eastern boundary of the Property, out to the point at the "Ladders" fishing site, approximately 323 feet in length.

The Applicant intends to keep the coastal access corridor in private ownership and does not intend to dedicate the coastal access corridor to the County. However, the applicant is committed to ensuring that the coastal access corridor will be kept free of structures to allow for access by shoreline fishermen who obtain the applicant's permission to access the coastal access corridors across the property to the coastal resources located down at the shoreline.

In furtherance of the access for shoreline fishermen, the Applicant has reached a general understanding with the Makahanaloa Fishing Association, an organization representing a large group

of fishermen from the Hamakua area ("Association"). It is contemplated that the Association would assist with the management of the coastal access corridor to allow for managed shoreline fishing access to minimize overuse of the finite coastal resources in the area, and to mitigate the potential liability to the Property owner from claims for injury that could occur when attempting to access the shoreline from the Property. The Applicant intends to execute a License for Shoreline Access over the coastal access corridor with the Association to govern the Association members' assumption of risk and indemnification of the Applicant and its affiliated parties, while also ensuring that the coastal access corridor is used lawfully.

The Applicant will accommodate on-site parking area for up to 3 cars for use by the Association and its members, immediately mauka of the proposed driveway to the residence within the Property. This will provide a secure area for the fishermen's vehicles when accessing the shoreline, while also mitigating the traffic and safety concerns resulting from the parking of vehicles along Highway 19, which is currently the practice.

The pedestrian coastal access corridor will be open to invitees of the Applicant, including the members of the Association, every day during daylight hours (from sunrise or 6:00 a.m., whichever is earlier, to one-half hour past sunset, or 6:00 p.m., whichever is later), seven (7) days a week. Access for night fishing past 6:00 p.m. shall be allowed for those individuals who are actively engaged in night fishing activities through a registration system managed by the Association, and will not include overnight camping within the Property.

The Applicant also proposes to install approximately shoreline access signs along the length of the roadway easement and the coastal access corridor to inform the public that they are on private property and warn of the steep coastal sea cliffs. Informational and warning signage will be limited to 6 to 8 signs to preserve the natural character of the area.

EVALUATION CRITERIA

The Department or Board will evaluate the merits of a proposed land use based upon the following eight criteria (*ref §13-5-30(c)*)

1. The purpose of the Conservation District is to conserve, protect, and preserve the important natural and cultural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. (*ref §13-5-1*) How is the proposed land use consistent with the purpose of the conservation district?

The Property is almost entirely located within the State Land Use ("SLU") Conservation District, Resource (R) Subzone. A small portion of the Property is located in the State Land Use Agricultural District. On October 9, 2020, State Land Use Commission staff informed the Applicant that the SLU Agricultural District and SLU Conservation Boundary is located along the makai (northwest) boundary of the old railroad right-of-way, as it occurs within the Property. (See "Exhibit M" - LUC email) The general location of the SLU boundary is identified on the State's Land Use District Boundary District Map from December 20, 1974, specifically District Map H-65 (Papaikou Quadrangle)(See "Exhibit N" - H-65 map and close up). The old railroad right-of-way boundary is generally located within Lot 79-1, which was created by a survey in 1951. Ref. "Exhibit B" Overall Site Plan). Unfortunately, the County Planning Department has no record of the subject 1951 survey. Because the 1951 survey could not be located, the Applicant's surveyor could not prepare the requested metes and bounds description for the portion of Lot 79-1 that crosses through the Property, and therefore, a formal boundary determination by the SLU Commission could not be provided. Nevertheless, based on the SLU District Map H-65, it is clear that the dwelling and all of the associated improvements are fully located within the SLU Conservation District. Furthermore, due to the limited size of the SLU Agricultural District and the presence of the old railroad right-of-way, the Applicant could only site the single-family dwelling within the SLU Conservation District.

HRS Section 205-2(e), provides that Conservation District shall include: "areas necessary for protecting watersheds and water sources; preserving scenic and historic area; providing park lands, wilderness, and beach reserves; conserving endemic plants, fish and wildlife; preventing floods and soil erosion; forestry; open space area whose existing openness; natural condition, or present state of use, if retained, would enhance the present or potential value of abutting or surrounding communities or would maintain or enhance the conservation of natural or scenic resources; areas of value for recreational purposes; other related activities; and other permitted uses not detrimental to a multiple use conservation concept."

The proposal to construct a modest single-family residence and related accessory uses for residential use for the enjoyment of the lot owner, which includes the removal non-native tree and plant species, is consistent with and compatible with the provisions and objectives of the Resource (R) subzone under HAR Sections 13-5-24(a) and (c), and the Protective (P) subzone under HAR Sections 13-5-22(a) and (b).

There are no plant species listed by the U.S. Fish and Wildlife Services or State that are threatened, endangered, proposed, or a candidate species or "species of concern" within the Property or immediate vicinity. There were no observable endangered or otherwise rare bird or mammal species located on the Property or immediate vicinity, and the Property is not included within the critical habitat for protected species. While it is certainly possible that endangered or rare native birds or the Hawaiian hoary bat could visit the Property, the Applicant is committed to implementing measures to mitigate impacts to these species.

The following measures will be implemented to help avoid impacts to endangered or rare native birds and the Hawaiian hoary bat:

- To minimize impacts to the endangered Hawaiian hoary bat, trees taller than 15 feet will not be removed or trimmed during the bat birthing and pup rearing season (June 1 through September 15).
- To minimize impacts to Hawaiian hawks, earthmoving within 100 meters of tall trees or any tree cutting during the breeding season for Hawaiian hawks (March through the end of September) will be avoided. If this time period cannot be avoided, the applicant will arrange for a hawk nest search to be conducted by a qualified biologist. If hawk nests are present on or near the property, all land clearing activity will cease until the expiration of the breeding season.
- To avoid potential seabird downing through interaction with outdoor lighting, no construction or unshielded equipment lighting will be used after dark between the months of April and October.

Minimal exterior lighting will be included, and it will be shielded in strict conformance with the Hawai'i County Outdoor Lighting Ordinance (Hawai'i County Code Chapter 9, Article 14). Lighting will be constrained to utilize only low light emitting fixtures using blue-deficient filtered LED lights with a Correlated Color Temperature (CCT) of 2700 Kelvin or less, and shielded to protect both transiting seabirds and dark skies.

Although it is unlikely that nēnē will be present on the Property, if they are, the Applicant will ensure that no nēnē will be harassed during construction or occupation of the dwelling. If nēnē nests are found, DLNR-DOFAW will be contacted.

The AIS for the Property identified 2 historic sites within the Property, however, the AIS recommended no additional historic preservation work for either site and concluded that no historic properties would be affected based on the proposed development. Furthermore, the single-family dwelling and accessory uses are not located in the proximity of these sites, so there will be no impacts from the proposed development.

Traditional subsistence gathering will also continue within the Property based on the Applicant's commitment to providing access to the area fishermen to the "Ladders" site. The development of a single-family dwelling and accessory uses on the Property will not cause the loss or destruction of any natural or cultural resources. As such, the proposed land use is consistent with the purpose and objective of the Conservation District, which seeks to ensure sustained use of the natural resources with proper management.

2. How is the proposed use consistent with the objectives of the subzone of the land on which the land use will occur? (ref §13-5-11 through §13-5-15)

HAR Section 13-5-13, provides that the objective of the Resource (R) subzone "is to develop, with proper management, areas to ensure sustained use of the natural resources of those area." The (R) subzone shall encompass:

- (1) Lands necessary for providing future parkland and lands presently used for national, state, county, or private parks;

- (2) Lands suitable for growing and harvesting or commercial timber or other forest products;
- (3) Lands suitable for outdoor recreational uses such as hunting, fishing hiking, camping, and picnicking;
- (4) Offshore islands of the State of Hawaii, unless placed in a (P) or (L) subzone;
- (5) Lands and state marine waters seaward of the uppers reaches of the wash of wavers, usually evidences by the edge of vegetation or by the debris left by the wash of waves on shore to the extent of the State's jurisdiction, unless placed in a (P) or (L) subzone.

The Property is located within the Resource subzone. The proposed single-family dwelling and related accessory uses, including landscaping and tree removal, are permitted land uses within the Resource (R) subzone under HAR Sections 13-5-24(a) and (c), and the Protective (P) subzone under HAR Section 13-5-22(a) and (b).

The construction of the proposed single-family dwelling is consistent with the objectives of the Resource Subzone, as it will allow the Applicant to properly manage the Property on a continual basis by removing and controlling the spread of invasive species, providing and maintaining access to the natural resources that are found along the coast through the coastal access corridors, and by maintaining the current open space character of the Property.

3. Describe how the proposed land use complies with the provisions and guidelines contained in chapter 205A, HRS, entitled "Coastal Zone Management" (*see 205A objectives on p. 9*).

The Property is located within the Special Management Area ("SMA") which runs from Highway 19 to the shoreline fronting the Property. All "development" within the SMA is administered by the County Planning Department pursuant to HRS Chapter 205A, and Planning Commission Rule 9. Act 16, effective September 15, 2020, amended HRS Chapter 205A to require an SMA Major or Minor Use Permit for construction of a single-family residence situated on a shoreline parcel. The Applicant intends to file for an SMA Minor Use Permit for the single-family dwelling and accessory uses following the State's acceptance of the Draft Environmental Assessment for processing.

The construction of the single-family dwelling and related accessory use improvements (the "proposed Project") complies with the provisions and guidelines contained in HRS Chapter 205A as follows:

Recreational resources: The proposed Project should not impact upon recreational resources, since the Applicant will provided a mauka-makai and lateral pedestrian coastal access corridor to allow access to "Ladders" fishing site to gain access to the shoreline.

Historic resources: Construction activities will be limited to the middle of the Property and therefore, the construction activities will not impact the 2 recognized historical sites located along the mauka portion of Property. As such, the proposed Project will not involve an irrevocable commitment to loss or destruction of any natural or cultural resources. Accordingly, the proposed Project does not conflict with the historic resources objectives and policies which aim to protect, preserve and where desirable restore significant historic and prehistoric resources in the coastal zone management area.

Scenic and open space resources: The Property is not listed as a distinctive and identifiable land form distinguished as landmarks or as having a front yard vista of distinctive features as identified in the General Plan, nor within the Hamakua Community Development Plan. According to a Visual Impact Assessment prepared by Ron Terry, Ph.D. dated October 2020, the proposed Project is not anticipated to change the visual attributes of the Property, as the proposed home site will not be visible from the Highway 19 or from the shoreline to the home. Views to and from the shoreline and Highway 19 would not be affected. The proposed Project is also designed to conform with Exhibit 4 of HAR, Chapter 13-5, Compatibility Provisions, which requires subtle and sensitive colors and architectural styles, minimal height, and landscaping utilizing almost exclusively native and Polynesian species. Although the home will not be visible to the general public except from the air or out to sea, its sensitive design will not cause any scenic impacts. The invasive ironwood tree removal to establish a sight line towards the sea on the north/northeast – coupled with planting native hala trees – would be undertaken, but this will not adversely affect any views of the Property from the shoreline or highway. To the degree there are any visual effects from this tree removal, the replacement of ironwood with hala will be positive. (See "Exhibit O" - Visual Impact Assessment).

Coastal ecosystems: There should be no physical disruption of the existing coastal habitat, and no changes that would affect the amount of wave energy striking the shoreline, as the proposed Project is centrally located within the Property setback at least 130 feet from the top of the pali, and the shoreline is located between 50 to 100 feet below the top of pali. Mauka-makai and lateral access to the coastal shoreline within the Property will not be curtailed since the Applicant will provide a coastal access corridor to provide necessary access to the shoreline. Therefore, the proposed development is consistent with the coastal ecosystem objectives and policies which aim to protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems. Known traditional and customary native Hawaiian practices and other valued cultural, historical or natural resources on the Property are located at the shoreline area below the Property, and the ability to continue to access the coastal resources is recognized and will be allowed by the Applicant.

Economic uses: The proposed Project will provide contributions to the economy, as a result of the planning, engineering, and construction related jobs required to implement the proposed Project. The long-term economic or social welfare of the community will not be negatively affected by the proposed Project, and will not preclude the development of coastal dependent economic uses or public and private facilities.

Coastal hazards: The proposed Project will be limited to the middle of the Property, setback a minimum of 130 feet from the top of pali, which should mitigate any potential for coastal hazard impacts. The Coastal Erosion Study confirmed that a coastal erosion rate of 0.15 ft./yr., and with the proposed Project setback a minimum of 130 feet from the top of pali, this distance more than exceeds the DLNR's minimum shoreline setback for the Property, which is 50.5-feet. Therefore, locating the proposed dwelling no closer than 130 feet to the top of pali limits the potential that that the proposed dwelling will be subject to coastal erosion.

The Property has been determined to be located in Flood Zone "X" by the National Flood Insurance Program's FIRM Map. (Ref. "Exhibit J" - FIRM Map). The Flood Zone "X" designation is reserved for areas with minimal flood hazards, including tsunami inundation. The Property also is not located within a County of Hawaii Tsunami Evacuation Zone.

In that the Applicant is proposing a minimum shoreline setback of 130 feet, as measured from the top of the pali, which far exceeds the minimum setback calculated per the DLNR standards, there would appear to be an ample margin of safety in protecting from the potential long-term impacts from coastal erosion at the property. In addition, the Property is designated entirely within Flood Zone "X" or outside the 500-year flood plain, per the FIRM map for the area. Flood Zone "X" is reserved for areas with minimal flood hazards, including tsunami inundation. The Property also is not located within a County of Hawaii Tsunami Evacuation Zone. Accordingly, the proposed project is consistent with the coastal hazards objectives and policies that provide for the control of development in areas subject to tsunami, flood, erosion and subsistence hazard.

4. Describe how the proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.

The proposed Project will not result in any significant adverse effect on the natural resources within the surrounding area, community or region. The potential short-term and temporary adverse effects on the surrounding area could be attributed to the construction activities, including potential noise, and impacts to air quality, however, these risks would be reduced or eliminated through the implementation of appropriate mitigative measures.

The proposed Project has been designed to harmonize with the existing physical environment. There will be no changes in the shoreline, as the construction activities are occurring in the middle of the Property and the shoreline is located 50 to 100 feet below the top of pali, which forms the makai boundary of the Property. Pedestrian access along the shoreline will not be curtailed, since the Applicant will provide a coastal access corridor to provide access to the "Ladders" fishing site, which will be used to gain access to the shoreline. Since the proposed Project is being developed within the middle of the Property and will be set back a minimum of 130 feet from the top of pali, which more than exceeds the minimum shoreline setback requirement, the proposed Project will not cause costly or irreparable environmental damage.

5. Describe how the proposed land use, including buildings, structures and facilities, is compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.

The proposed Project is will only involve approximately 0.98 acres of the much larger 6.485-acre parcel, and the remaining portion of the Property will continue to remain in its natural condition, with the exception of the removal of certain invasive plant / tree species throughout the Property, as further illustrated on Landscaping Plans and Tree Removal Aerial, attached as "Exhibit E" and "Exhibit F" respectively. In addition, the proposed design and siting of the residential dwelling and related accessory use improvements in the middle of the Property will ensure that the development is compatible with the visual environment, thus minimizing the public's view from Highway 19 and from along the shoreline. The Applicant will also implement earth tone colors for the dwelling and accessory structures and use appropriate landscaping near the dwelling to help blend the dwelling into the surroundings, in compliance with Exhibit 4 of HAR, Chapter 13-5, Compatibility Provisions. The Applicant will also install minimal exterior lighting using low light emitting fixtures with blue-deficient filtered LED lights, with proper sufficient shielding to protect dark skies and transiting seabirds.

The abutting Property located immediately northwest of the Property (TMK: (3) 2-8-013:010) is similarly located on the makai side of Highway 19, and classified SLU Agricultural and SLU Conservation District by the State Land Use Commission, and similarly County zoned "Agricultural" with a minimum lot size of 20 acres (A-20a). Parcel 10 contains 2 large dwellings and an agricultural building. Immediately adjacent to Parcel 10 along its northwest boundary, is TMK: (3) 2-8-013:038, which is also located makai of Highway 19, and similarly SLU classified and County zoned as the Property. Parcel 38 is home to the Palms Cliff House Inn, which is a 17 bedroom and 10 bath, bed and breakfast operation. Also, the Property, at its closest point, is located less than 1,300 feet from the town of Honoumuli. The town of Honoumuli located in the SLU Urban District, and is County zoned single-family residential with a minimum lot size of 10,000 square feet, with some Neighborhood Commercial zoning located at the core of Honoumuli. Based on the close proximity to these similar residential uses, the proposed Project is harmonious compatible with the surrounding area.

6. Describe how the existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon.

The proposed Project has been designed to harmonize with the existing physical environment. The proposed home site will be set back a minimum of 130 feet from the top of pali, and therefore, there will be no changes in the shoreline or topography in this area. According to the Visual Impact Analysis, the proposed Project is not anticipated to change the visual attributes of the Property, as the proposed home site will not be visible from the Highway 19 or from the shoreline to the home. Views to and from the shoreline and Highway 19 would not be affected. The proposed Project is also designed to conform with Exhibit 4 of HAR, Chapter 13-5, Compatibility Provisions, which requires subtle and sensitive colors and architectural styles, minimal height, and landscaping utilizing almost exclusively native and Polynesian species. As stated earlier, although the dwelling will not be visible to the general public except from the air or out to sea, its sensitive design will not cause any scenic impacts. The invasive ironwood tree removal to establish a sight line towards the sea on the north/northeast – coupled with planting native hala trees – would be undertaken, but this will not adversely affect any views of the Property from the shoreline or to Highway 19. To the degree there are any visual effects from this tree removal, the replacement of ironwood with hala will be positive in that it would restore the existing landscape to a more natural setting with a concentration of native trees that are common to the area.

7. If applicable, describe how subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.

NOT APPLICABLE

8. Describe how the proposed land use will not be materially detrimental to the public health, safety and welfare.

The economic or social welfare of the community will be positively affected from creation of construction related jobs. The proposed Project should not preclude the development of coastal dependent economic uses and/or public and private facilities. Public health will not be affected since temporary construction activities for the proposed Project are anticipated to last less than a year and can be properly mitigated through standard best management construction practices. The proposed single-

family residence, accessory use improvements, and landscaping and tree removal, are identified and permitted uses within the Resource (R) subzone under HAR Sections 13-5-24(a) and (c) and Protective (P) subzone under HAR Sections 13-5-2(a) and (b). The proposed Project will be constructed in compliance with the single-family residential standards for the Conservation District and should not be materially detrimental to public health, safety and welfare.




CULTURAL IMPACTS

Articles IX and XII of the State Constitution, other state laws, and the courts of the State, require government agencies to promote and preserve cultural beliefs, practices, and resources of Native Hawaiians and other ethnic groups.


Please provide the identity and scope of cultural, historical, and natural resources in which traditional and customary native Hawaiian rights are exercised in the area.

The AIS identified a portion of a previously recorded site, namely Site 50-10-26-24212, which was a highly eroded portion of the Hilo Railroad-Hawaii Consolidated Railway bed near the western boundary of the Property, although there were no other infrastructural elements associated with the railroad were found within site. The AIS also identified a newly recorded site, specifically Site 50-10-26-31238, which is a cut earthen ditch located along the southeastern edge of the Malamalama Gulch near the northern boundary of the Property. This earthen ditch was determined to be a small remnant section of an historic flume that had once traversed the site. This section was found to be highly eroded and the structural elements that were formally associated with the flume are no longer present. No additional historic preservation work was recommended for either site, and therefore, the recommended determination of effect for the Property was "no historic properties affected".



As discussed in the "Existing Conditions - Historical and Cultural Resources" discussion on page 11 above, the CIA for the Property informed that traditional and cultural subsistence practices was primarily limited to gathering at the shoreline, as the Property was formerly cultivated for sugarcane. (Ref. "Exhibit L" - CIA). According to the CIA, the shoreline was accessed through the Property using methods to rappel down the sea cliffs. Gathering at the shoreline included near-shore marine resources, such as 'opihi, eels, lobsters, turtles, and fish, and freshwater resources from the streams, such as 'opae, 'o'opu, and prawns.

The consulted parties identified the prior use of the "Ladders" fishing site to access the shoreline below the Property. The "Ladders" fishing site consists of a series of dilapidated ladders that descend approximately 100 feet down a steep seacliff at a peninsula located outside of the Property, near the makai (northeast) corner property boundary. The consulted parties expressed a desire for access to the "Ladders" fishing site to allow for continued subsistence gathering at the shoreline below, despite the dangerous state of the ladders. The consulted parties were also concerned about overuse of the coastal resources and the hazardous situations that could arise from inexperienced users attempting to scale the sea cliff to the shoreline below the Property. Several of the consulted parties expressed a preference that access to the "Ladders" fishing site be managed similarly to other residential developments along the Hamaku'a coast through a joint-partnership arrangement with the landowner and an area fishing organization.



The Applicant has reached a general understanding with the Makahanaloa Fishing Association, which is an organization comprised of a large group of area fishermen, to assist with the management of the coastal access corridors, as described in the "Existing Conditions - Historical and Cultural Resources" discussion on page 12 above. The additional management component will also serve to absolve the Applicant from the potential liability risks due to the hazardous nature of the sea cliffs, and to ensure that the coastal access corridors are used lawfully.

The coastal access corridors will not be dedicated to the County, however, the Applicant is committed to ensuring that the coastal access corridors will be kept free of structures, and access will be allowed to those that have obtained the Applicant's or the Makahanaloa Fishing Association's permission to access the coastal access corridors. These coastal access corridors will be open 7 days a week during daylight hours (from sunrise or 6:00am, whichever is earlier, to one-half hour past sunset, or 6:00pm, whichever is later). Night fishing after 6:00pm will also be allowed, based on arrangements with the Association, and overnight camping will not be allowed.

The Property is also not among those listed as historic properties in the Hawaii State Register of Historic Places, has not been determined to be eligible for inclusion in the National Register of Historic Places, and is not profiled as a significant cultural and/or historic site in the General Plan within the South Hilo district, and in the Hamakua Community Development Plan.

Identify the extent to which those resources, including traditional and customary Native Hawaiian rights, will be affected or impaired by the proposed action.

The proposed Project will not result in a significant adverse impact to the identified traditional and customary practices, as the Applicant will continue to allow traditional subsistence gathering through providing access to the shoreline, as recommended by the CIA. The Applicant has reached a general understanding with the Makahanaloa Fishing Association to assist with the management of the coastal access corridors, which was a recommendation of the CIA.

With the exception of the fishing and gathering at the shoreline, there were no other observable traditional and customary native Hawaiian practices being exercised outside the shoreline area. Known traditional and customary native Hawaiian practices and other valued cultural, historical or natural resources on the Property are located at the shoreline area and will continue to be recognized and allowed by the Applicant. Therefore, other than the mitigative measures that would be monitored by the State, there is no other reasonable action to be taken to preserve these resources.

In addition, the Property is not listed as a historic property in the Hawaii State Register of Historic Places, has not been determined to be eligible for inclusion in the National Register of Historic Places, and is not profiled as a significant cultural and/or historic site in the General Plan, and in the Hamakua Community Development Plan. The Applicant anticipates no adverse impacts as a result of implementing the proposed action.

What feasible action, if any, could be taken by the Board of Land and Natural Resources in regards to your application to reasonably protect Native Hawai'i rights?

The Applicant is aware that the exercise of traditional, customary or religious practices of native Hawaiians in the immediate area of the Property is provided for by the State Constitution and State law and expects that a condition ensuring the protection of such practices will be codified within the requested Conservation District Use Permit approval.

OTHER IMPACTS

Does the proposed land use have an effect (positive/negative) on public access to and along the shoreline or along any public trail?

The Applicant is committed to providing access to area fishermen by granting access through the Property to the "Ladders" site, in addition to accommodating up to 3 parking stalls on-site for these fishermen. Known traditional and customary native Hawaiian practices and other valued cultural, historical or natural resources on the Property are located at the shoreline area and access to these resources will continue to be recognized and allowed by the Applicant.

Does the proposed use have an effect (positive/negative) on beach processes?

No, as the shoreline is located 50 to 100 feet at the bottom of sea cliffs below the top of pali. The proposed construction activities will be focused towards the middle of the Property and set back a minimum of 130 feet from the top of pali. There should no effect on the beach processes as a result of the development of the proposed single-family dwelling and its accessory uses within the Property.

Will the proposed use cause increased sedimentation?

The Applicant is proposing to exceed the minimum shoreline setback required by Exhibit 4 of HAR Chapter 13-5, and the Coastal Erosion Study recommendation, by locating the proposed dwelling no closer than 130 feet to the top of pali. By setting the dwelling back a minimum of 130 feet from the top of pali, this will limit the potential that the proposed dwelling and related construction activities would increase sedimentation. As discussed earlier, silt fencing will be installed along the lower edges of the area proposed for grading to control potential erosion during construction activities. The silt fencing will remain in place until construction activities are completed. Sandbag silt barriers will also be installed, as needed, to control silt runoff. Furthermore, the vegetated area makai of the dwelling will be left undisturbed to serve as a sizable vegetative buffer against any potential movement of soil from the site, especially towards the sea.

Will the proposed use cause any visual impact on any individual or community?

As discussed earlier, the Visual Impact Assessment concluded that the construction of the proposed dwelling would not lead to any visual impacts for the general public. There are no ocean views from Highway 19 on the approaches from the north or south. Since the dwelling is proposed for construction near the middle of the Property, the views to and from the shoreline, from the sea, and from Highway 19, is almost entirely blocked by trees and/or existing topography.

Please describe any sustainable design elements that will be incorporated into the proposed land use (e.g. the use of efficient ventilation and cooling systems; renewable energy generation; sustainable building materials; permeable paving materials; efficient energy and water systems; efficient waste management systems; etc.).

The single-family dwelling was designed to support efficient use of energy and materials to promote natural ventilation and lighting within the dwelling. The landscaping plan for the dwelling was also designed with energy efficiency in mind, as the proper siting of trees, shrubs, and landscaping around the

dwelling will decrease solar gain, which will help to cool the structure, lessening the need for air conditioning.

The proposed single-family dwelling will be off-grid (with the exception of hardline telephone service). The dwelling will be supported by sustainable utilities, such as a roof top PV system with backup storage, which will allow the Applicant to generate energy for the dwelling without reliance on traditional power sources that typically contributes to increased greenhouse gas emissions.

The Applicant is also planning to install energy-efficient appliances, such as the 2 tankless gas-on-demand water heaters, which will provide hot water only as it is needed. These tankless water heaters do not produce the standby energy losses associated with typical storage water heaters, and are therefore, incredibly energy-efficient. The Applicant will also install water-efficient low flow toilets and fixtures, which will limit the amount of water and power needed to supply water to the dwelling.

If the project involves landscaping, please describe how the landscaping is appropriate to the Conservation District (*e.g. use of indigenous and endemic species; xeriscaping in dry areas; minimizing ground disturbance; maintenance or restoration of the canopy; removal of invasive species; habitat preservation and restoration; etc.*)


As discussed earlier, the Applicant will ensure that the existing native plants hala, naupaka and neneleau are preserved, and has developed a Landscape Plan featuring native elements, as is encouraged by Exhibit 4 of HAR 13-5. (Ref. "Exhibit E"). The Applicant is proposing the planting of ground cover, small shrubbery, and palms around the perimeter of the dwelling. The landscaping plans propose to replace non-native vegetation near the home site with native, Polynesian and non-invasive ornamental trees, groundcover and ferns, along with some fruit trees and a kitchen garden. Native plant species being considered are gardenia nanu, pohinahina, 'akia, hinahina kukahakai, ma'o, naupaka kahakai, nehe, wililwili, 'ilima, a'ali'i and 'ulei. Approximately 88% (4,371 sq.ft.) of the plantings will consist of native plants, while the remaining 12% (557 sq.ft.) will consist of non-native ornamental plantings.

The landscaping plan also includes removal of various non-native trees – especially ironwood and fiddlewood – to stabilize the cliff, promote native vegetation and open a view corridor to the north/northeast. The Applicant's arborist will use of the crane truck to carefully removal of the trees in sensitive areas such as the top of pali. Use of the crane truck will decrease the potential impacts to the surrounding area, especially along the cliff face and to the ocean, in addition to reducing the overall time needed to remove the trees from the Property. The planting of native hala along the top of pali will help to further reinforce the stability of the sea cliffs that form the seaward boundary of the Property and help to restore the native vegetation of the area.

Please describe Best Management Practices that will be used during construction and implementation of the proposed land use.

The grading activities would be mitigated through the implementation of Best Management Practices. For the required utility trenching, the extracted materials will be used to refill the trenched areas and to blend the areas with the surrounding topography.

The Applicant will ensure all earthwork and grading is conducted in conformance with:

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- (a) "Storm Drainage Standards," County of Hawai'i, October, 1970, and as revised.
 - (b) Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawai'i County Code.
 - (c) Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
 - (d) Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawai'i County Code.
 - (e) Conditions of an NPDES permit, if required, and
 - (f) Any additional best management practices required by the Board of Land and Natural Resources.

The Applicant will also require that the grading contractor implement the following practices:

- Minimizing the total amount of land disturbance required, which will be delineated to the contractor prior to the commencement of any onsite work. The makai limits of grading will be marked and fenced at the construction areas to avoid any possible disturbance to the ground or vegetation within makai area during construction activities.
- No concrete truck washout or equipment servicing will be allowed on site.
- The contractor will take special precautions so as to not allow any sediment to leave the work areas, particularly towards the sea.
- Construction activities with the potential to produce stormwater run-off will not be allowed during periods of unusually heavy rains or storm conditions.
- Prior to the start of construction, contractors will implement erosion and dust control measures, including silt fences along the lower margin of grading, silt barriers (snakes) around stockpiles, protecting drainage sumps from siltation, etc., to prevent any sediment from leaving the construction areas, especially towards the ocean.
- Graded areas will be replanted or otherwise stabilized following grading activity.

In order to minimize the potential for spills of hazardous materials, the Applicant will ensure that the contractor's also adhere to the following:

- Unused materials and excess fill (if any) will be disposed of at an authorized waste disposal site.
- During construction, emergency spill treatment, storage, and disposal of all hazardous materials, will be explicitly required to meet all State and County requirements, and the contractor will adhere to "Good Housekeeping" for all appropriate substances, with the following instructions:
 1. Onsite storage of the minimum practical quantity of hazardous materials necessary to complete the job;
 2. Fuel storage and use will be conducted to prevent leaks, spills or fires;

3. Products will be kept in their original containers unless unresealable, and original labels and safety data will be retained;

4. Disposal of surplus will follow manufacturer's recommendation and all regulations;

5. Manufacturers' instructions for proper use and disposal will be strictly followed;

6. Regular inspection by contractor to ensure proper use and disposal;

7. Onsite vehicles and machinery will be monitored for leaks and receive regular maintenance;

8. Construction materials, petroleum products, wastes, debris, and landscaping substances (herbicides, pesticides, and fertilizers) will be prevented from blowing, falling, flowing, washing or leaching into the ocean; and

9. All spills will be cleaned up and properly disposed of immediately after discovery.

Please describe the measures that will be taken to mitigate the proposed land use's environmental and cultural impacts.

As discussed in our response on the Best Management Practices that will be implemented during construction, the Applicant will require that the contractors working on the proposed Project strictly adhere to the BMPs stated above to mitigate impacts to water quality and hazardous materials. In addition, as also discussed earlier, the following measures will be implemented to help avoid impacts to endangered or rare native birds and the Hawaiian hoary bat:

- To minimize impacts to the endangered Hawaiian hoary bat, trees taller than 15 feet will not be removed or trimmed during the bat birthing and pup rearing season (June 1 through September 15).
- To minimize impacts to Hawaiian hawks, earthmoving within 100 meters of tall trees or any tree cutting during the breeding season for Hawaiian hawks (March through the end of September) will be avoided. If this time period cannot be avoided, the applicant will arrange for a hawk nest search to be conducted by a qualified biologist. If hawk nests are present on or near the property, all land clearing activity will cease until the expiration of the breeding season.
- To avoid potential seabird downing through interaction with outdoor lighting, no construction or unshielded equipment lighting will be used after dark between the months of April and October.

Minimal exterior lighting will be included, and it will be shielded in strict conformance with the Hawai'i County Outdoor Lighting Ordinance (Hawai'i County Code Chapter 9, Article 14). Lighting will be constrained to utilize only low light emitting fixtures using blue-deficient filtered LED lights with a Correlated Color Temperature (CCT) of 2700 Kelvin or less, and shielded to protect both transiting seabirds and dark skies.

Although it is unlikely that nēnē will be present on the Property, if they are, the Applicant will ensure that no nēnē will be harassed during construction or occupation of the residence. If nēnē nests are found, DLNR-DOFAW will be contacted.

The one cultural practice that occurs adjacent to the Property is the shoreline fishing and gathering after descending the steep pali by ladders or ropes. This practice will continue through access managed by community members.

SINGLE FAMILY RESIDENTIAL STANDARDS

Single Family Residences must comply with the standards outlined in HAR Chapter 13-5, Exhibit 4. Please provide preliminary architectural renderings (e.g. building foot print, exterior plan view, elevation drawings; floor plan, etc.) drawn to scale.

SIZE OF LOT

	Existing	Proposed	Total
Proposed building footprint	0	4,447 sq.ft.	4,447 sq.ft.
Paved areas/ impermeable surfaces	0	12,070 sq.ft.	12,070 sq.ft.
Landscaped areas	0	26,393 sq.ft.	26,393 sq.ft.
Unimproved areas	6.485 acres or 282,486.6 sq.ft. (Area of full lot)	42,910 sq.ft.	239,576.6

SETBACKS Front: 25-ft Side: 25-ft Back: 25-ft

SHORELINE PROPERTIES

Average Lot Depth (ALD): Average annual coastal erosion rate: 0.15 ft., based on the calculations presented in the attached Coastal Erosion Study (Ref. "Exhibit J").

Minimum shoreline setback based on Exhibit 4: 50.5 ft. $[40 + (70 \times 0.15 \text{ ft./yr.})]$

Actual shoreline setback or proposed structure: 130-ft

MAXIMUM DEVELOPABLE AREA

The Maximum Developable Area includes all floor areas under roof, including first, second, and third stories, decks, pools, saunas, garage or carport, and other above ground structures.

Maximum Developable Area based on Exhibit 4: 5,000 sq.ft. (for lots over 1-acre in size)

Actual Developable Area of proposed residence: 4,877 sq.ft. (Total Development Area)

Actual height of the proposed building envelope as defined in Exhibit 4: 21 feet

COMPATIBILITY

Provide justification for any propose deviation from the established residential standards.

No deviation from the established Residential Standards are required for the proposed project.

How is the design of the residence compatible with the surrounding area?

The design of the single-family dwelling is compatible with the surrounding area, which consists primarily of rural single-family homes, associated with farming, grazing, and recreational uses. The design of the proposed dwelling and related improvements also adheres to the Compatibility Provisions, as described in Chapter 13-5, HAR, Exhibit 4, Single-Family Residential Standards.

If grading is proposed, include a grading plan which provides the amount of cut and fill. Has grading or contouring been kept to a minimum?

Yes, as the total amount of land being cleared for construction activities is limited to approximately 0.98 acres of the 6.485-acre Property, or only 15% of the total land area within the Property. The proposed grading will consist of approximately 2,000 cubic yards and fill of 2,752 cubic yards to accommodate the natural contours of the land at finish grade, resulting in a balance of cut and fill, so as not to require any importation of additional fill material, consistent with the Compatibility Provisions of HAR, Chapter 13-5, Exhibit 4. (Ref. "Exhibit G"- Grading Plan, Civil Notes and Civil Details). The grading for the site has been kept to a minimum by selecting a previously disturbed and relatively level portion of the Property for the dwelling. The grading activities will only alter the existing contours needed to create a level pad for the dwelling, and would be accomplished by balancing the cut and fill.

CHAPTER 205A – COASTAL ZONE MANAGEMENT

Land uses are required to comply with the provisions and guidelines contained in Chapter 205A, Hawai'i Revised Statutes (HRS), entitled "Coastal Zone Management," as described below:

- **Recreational resources:** Provide coastal recreational opportunities accessible to the public.
- **Historic resources:** Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.
- **Scenic and open space resources:** Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
- **Coastal ecosystems:** Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.
- **Economic uses:** Provide public or private facilities and improvements important to the State's economy in suitable locations.
- **Coastal hazards:** Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.
- **Managing development:** Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
- **Public participation:** Stimulate public awareness, education, and participation in coastal management.
- **Beach protection:** Protect beaches for public use and recreation.
- **Marine resources:** Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

CERTIFICATION

I hereby certify that I have read this completed application and that, to the best of my knowledge, the information in this application and all attachments and exhibits is complete and correct. I understand that the failure to provide any requested information or misstatements submitted in support of the application shall be grounds for either refusing to accept this application, for denying the permit, or for suspending or revoking a permit issued on the basis of such misrepresentations, or for seeking of such further relief as may seem proper to the Land Board.

I hereby authorize representatives of the Department of Land and Natural Resources to conduct site inspections on my property. Unless arranged otherwise, these site inspections shall take place between the hours of 8:00 a.m. and 4:30 p.m.

Signature of authorized agent(s) or if no agent, signature of applicant

AUTHORIZATION OF AGENT

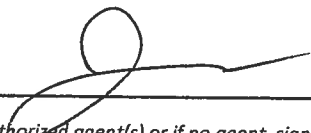
I hereby authorize _____ Carlsmith Ball, LLP _____ to act as my representative and to bind me in all matters concerning this application.

Signature of applicant(s)

CERTIFICATION

I hereby certify that I have read this completed application and that, to the best of my knowledge, the information in this application and all attachments and exhibits is complete and correct. I understand that the failure to provide any requested information or misstatements submitted in support of the application shall be grounds for either refusing to accept this application, for denying the permit, or for suspending or revoking a permit issued on the basis of such misrepresentations, or for seeking of such further relief as may seem proper to the Land Board.


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Signature of applicant(s)

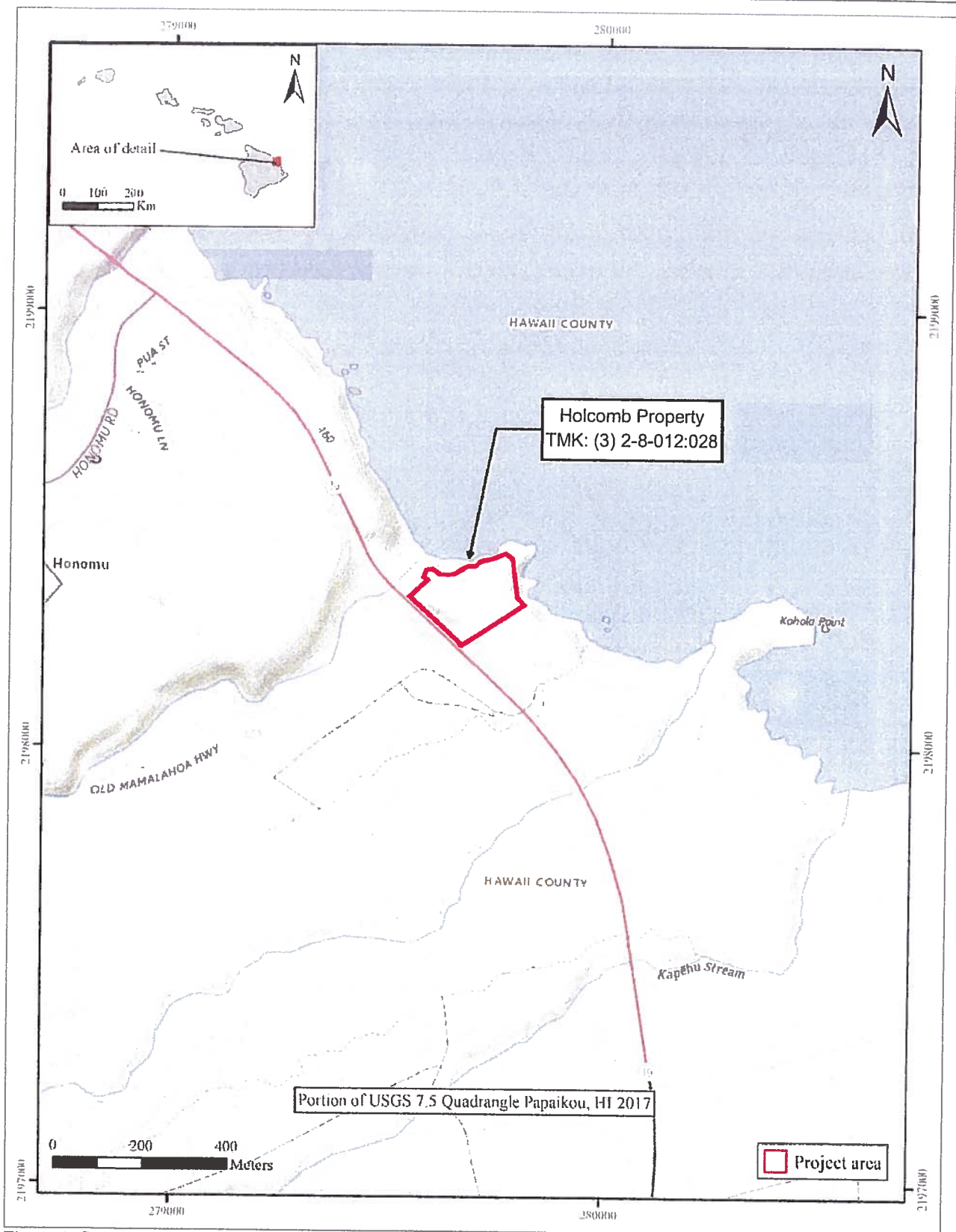


Figure 1. Study area location.

AREA TABULATIONS

MAXIMUM DEVELOPED AREA (MDA) ALLOWED:	5,000 SF
PROPOSED DEVELOPED AREA	
RESIDENCE:	
INTERIOR AREA:	3,018 SF
COVERED LANAI AREA:	711 SF
GARAGE AREA:	630 SF
ENTRY AND LANDINGS:	88 SF
RESIDENCE TOTAL:	4,447 SF
ASSOCIATED STRUCTURES:	
POOL:	364 SF
WELL PUMP:	36 SF
A/C COMPRESSORS:	6 SF
GENERATOR:	12 SF
PROPANE:	12 SF
ASSOCIATED STRUCTURES TOTAL:	430 SF
TOTAL PROPOSED DEVELOPED AREA:	4,877 SF

ITEM	AREA	CUBIC YARDS
Pool Excavation	16' x 28'	180 CY
Septic Tank Excavation	10' x 12'	35 CY
Septic Tank Installation	10' x 12'	35 CY
Well Pad Grading	10' x 12'	35 CY
Well Pad Grading	10' x 12'	35 CY
Well Pad Grading	10' x 12'	35 CY
Well Pad Grading	10' x 12'	35 CY
Well Pad Grading	10' x 12'	35 CY
Well Pad Grading	10' x 12'	35 CY
Well Pad Grading	10' x 12'	35 CY

MATTHEW M. GRAVES, AIA
P.O. BOX 804
HONOLULU, HAWAII 96812
(808) 937-8770
E-MAIL: MATTHEW@MGM.COM

4/20/22
KELLY HOLCOMB
PROPOSED SINGLE FAMILY RESIDENCE FOR
HONOLULU, HAWAII 96812
TWP. 2 S B 012 028

KELLY HOLCOMB
PROPOSED SINGLE FAMILY RESIDENCE FOR
HONOLULU, HAWAII 96812
TWP. 2 S B 012 028

REVISIONS	DATE	BY	APP'D
1	4/20/22		
2			
3			
4			
5			
6			
7			
8			
9			
10			

A1.0

SITE PLAN

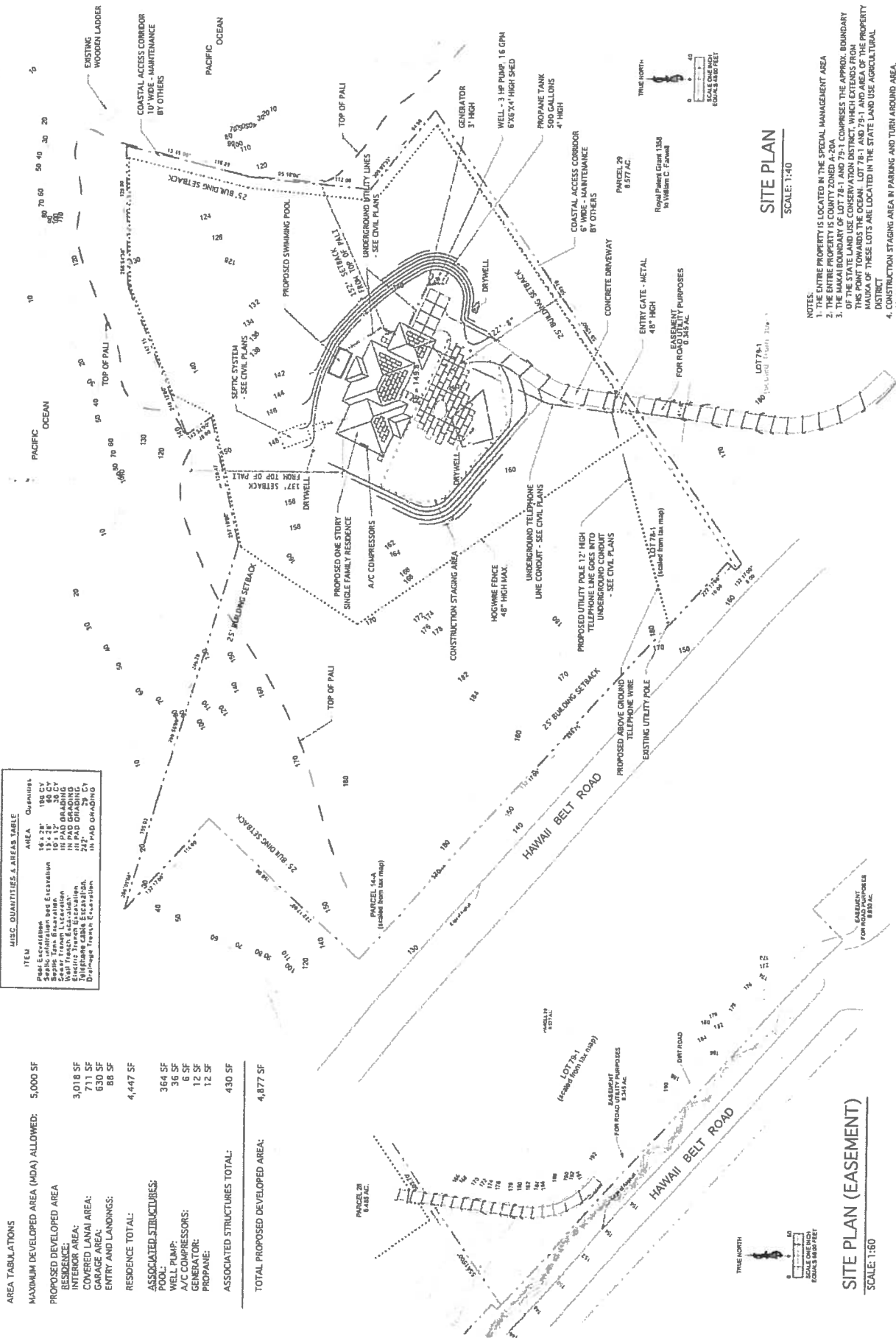
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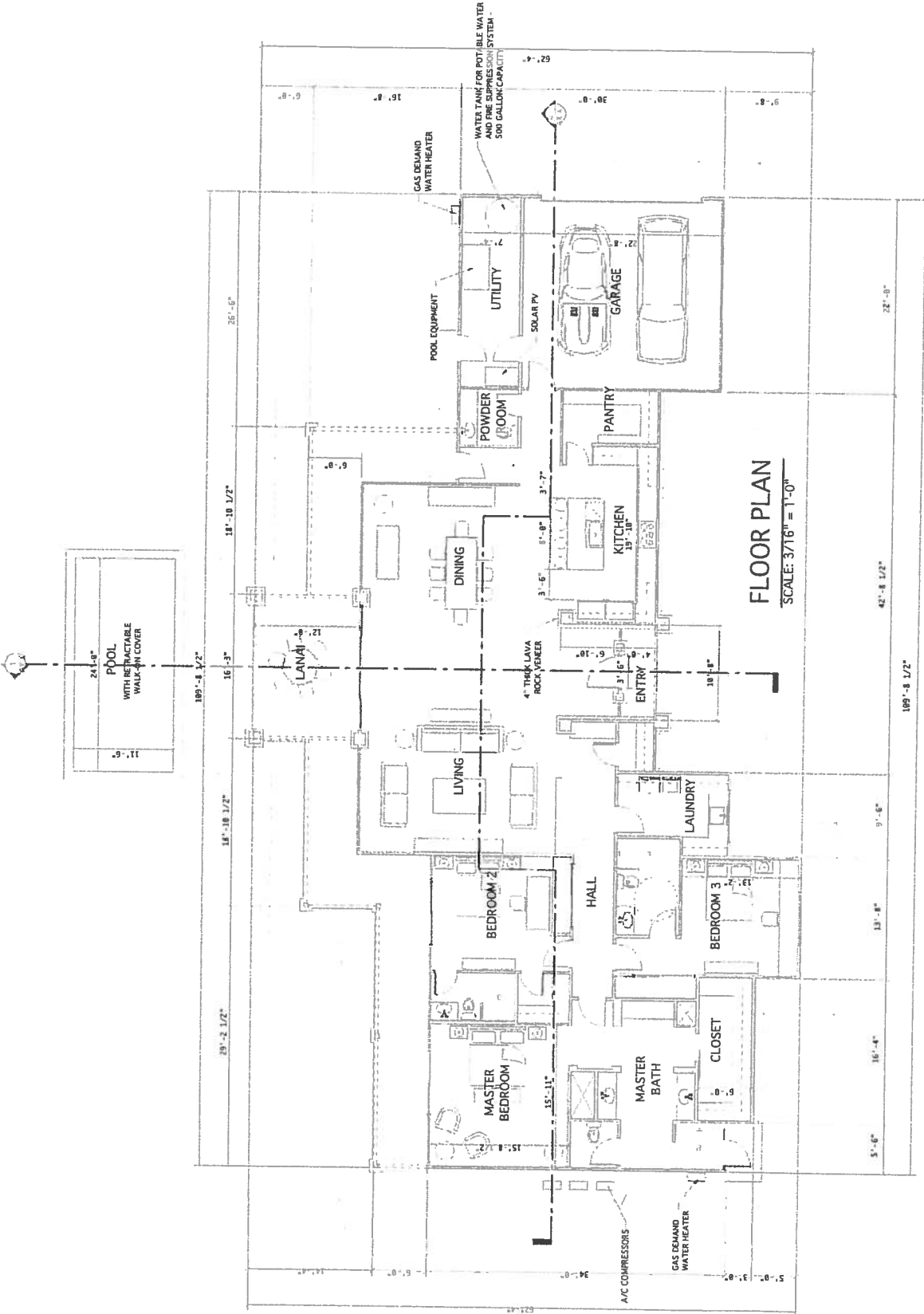
- NOTES:
1. THE ENTIRE PROPERTY IS LOCATED IN THE SPECIAL MANAGEMENT AREA.
 2. THE ENTIRE PROPERTY IS COUNTY ZONED A-20A.
 3. THE HAWAII BOUNDARY OF LOT 78-1 AND 79-1 COMPRISES THE APPROX. BOUNDARY OF THE STATE LAND USE CONSERVATION DISTRICT, WHICH EXTENDS FROM THE HAWAII BOUNDARY OF LOT 78-1 AND 79-1 AND 79-1 AND AREA OF THE PROPERTY MAJORITY OF THESE LOTS ARE LOCATED IN THE STATE LAND USE AGRICULTURAL DISTRICT.
 4. CONSTRUCTION STAGING AREA IN PARKING AND TURN AROUND AREA. APPROX. 4000 SQ. FT.

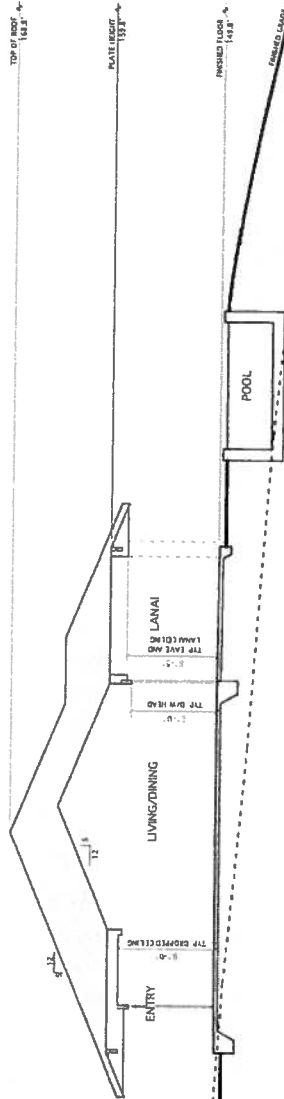
EXHIBIT B

SITE PLAN (EASEMENT)

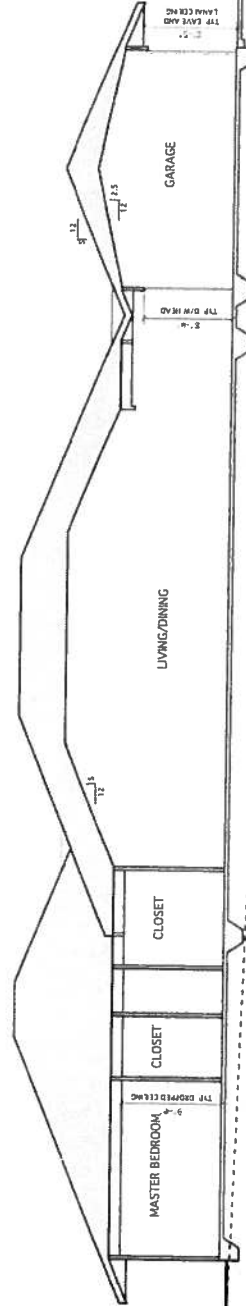
SCALE: 1"=80'







1 BUILDING SECTION
SCALE: 3/16" = 1'-0"



2 BUILDING SECTION
SCALE: 3/16" = 1'-0"

MATTHEW M. GRAVES, AIA

E. M. GRAVES, ARCHITECT
HONOLULU, HAWAII 96813
P.O. BOX 884
(808) 537-5770

4/30/22
PROJECT: KAHALA RESIDENCE
SHEET: 01 OF 02
DRAWN BY: M. GRAVES
CHECKED BY: M. GRAVES

PROPOSED 5 BED, 6 BATH RESIDENCE
KELLY HOLCOMB
283426 HAWAII BELT ROAD
HONOLULU, HAWAII 96828
TMR 2 0 012 028

REVISIONS

DATE

BY

REVISIONS

DATE

BY

REVISIONS

DATE

BY

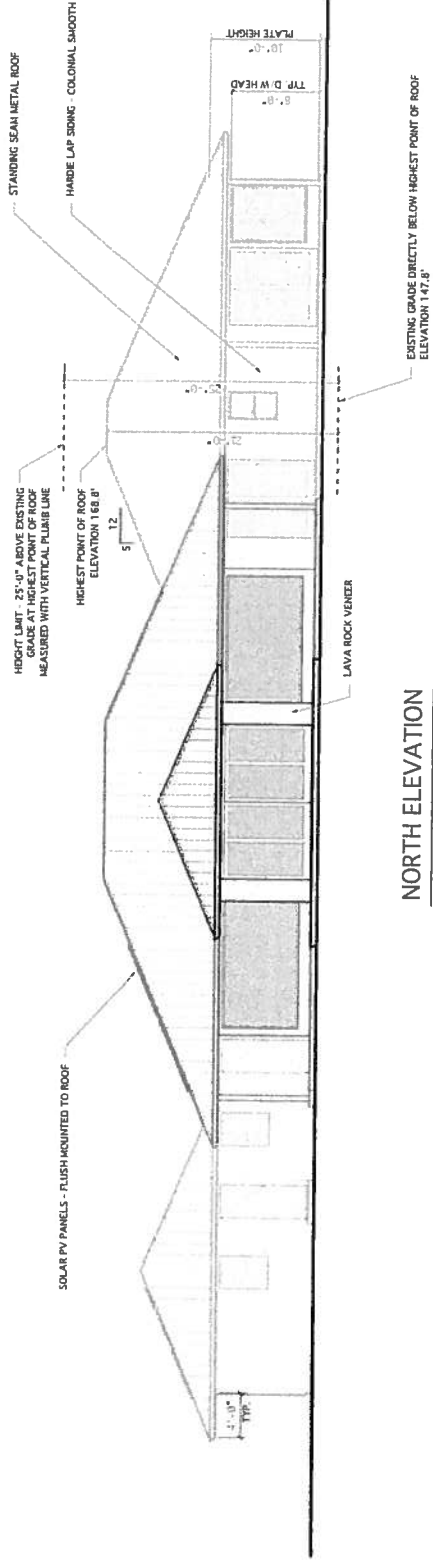
REVISIONS

DATE

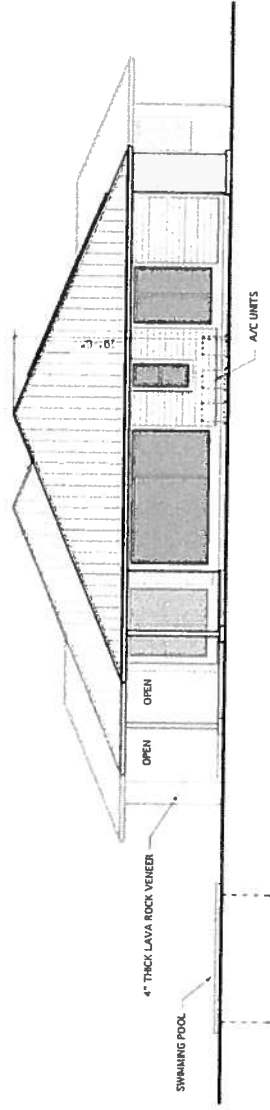
BY

REVISIONS

A3.1



NORTH ELEVATION
SCALE: 3/16" = 1'-0"



WEST ELEVATION
SCALE: 3/16" = 1'-0"

MATTHEW M. GRAVES, AIA

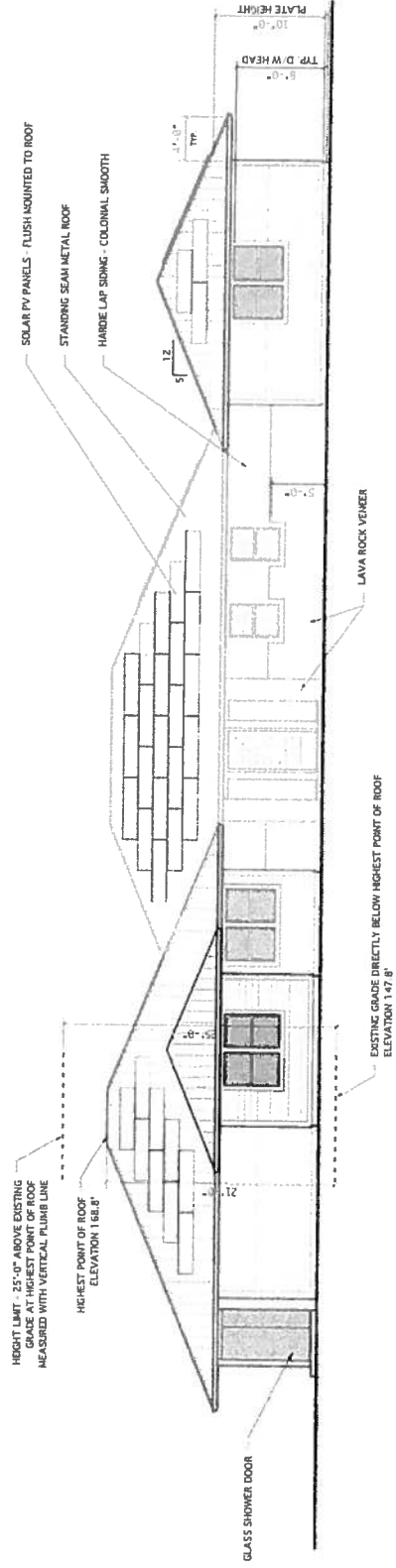
PROJECT: 20-3426 HAWAII BLT ROAD
HONOLULU, HAWAII 96828
DATE: 3/1/21
SCALE: 1/4" = 1'-0"

REVISIONS

PROPOSED SINGLE FAMILY RESIDENCE FOR
KELLY HOLCOMB

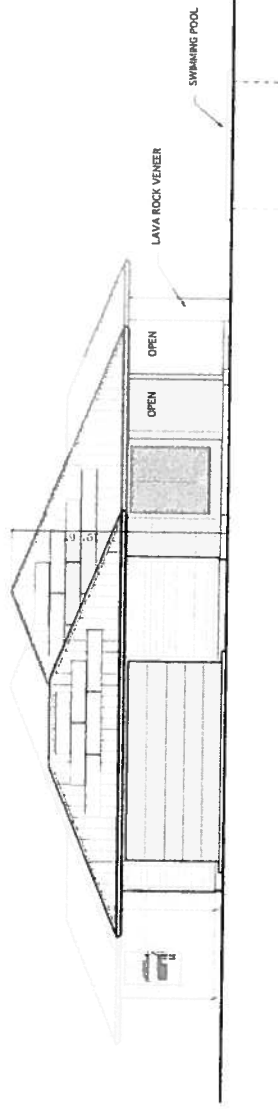
20-3426 HAWAII BLT ROAD
HONOLULU, HAWAII 96828
DATE: 3/1/21
SCALE: 1/4" = 1'-0"

A3.0



SOUTH ELEVATION

SCALE: 3/16" = 1'-0"



EAST ELEVATION

SCALE: 3/16" = 1'-0"

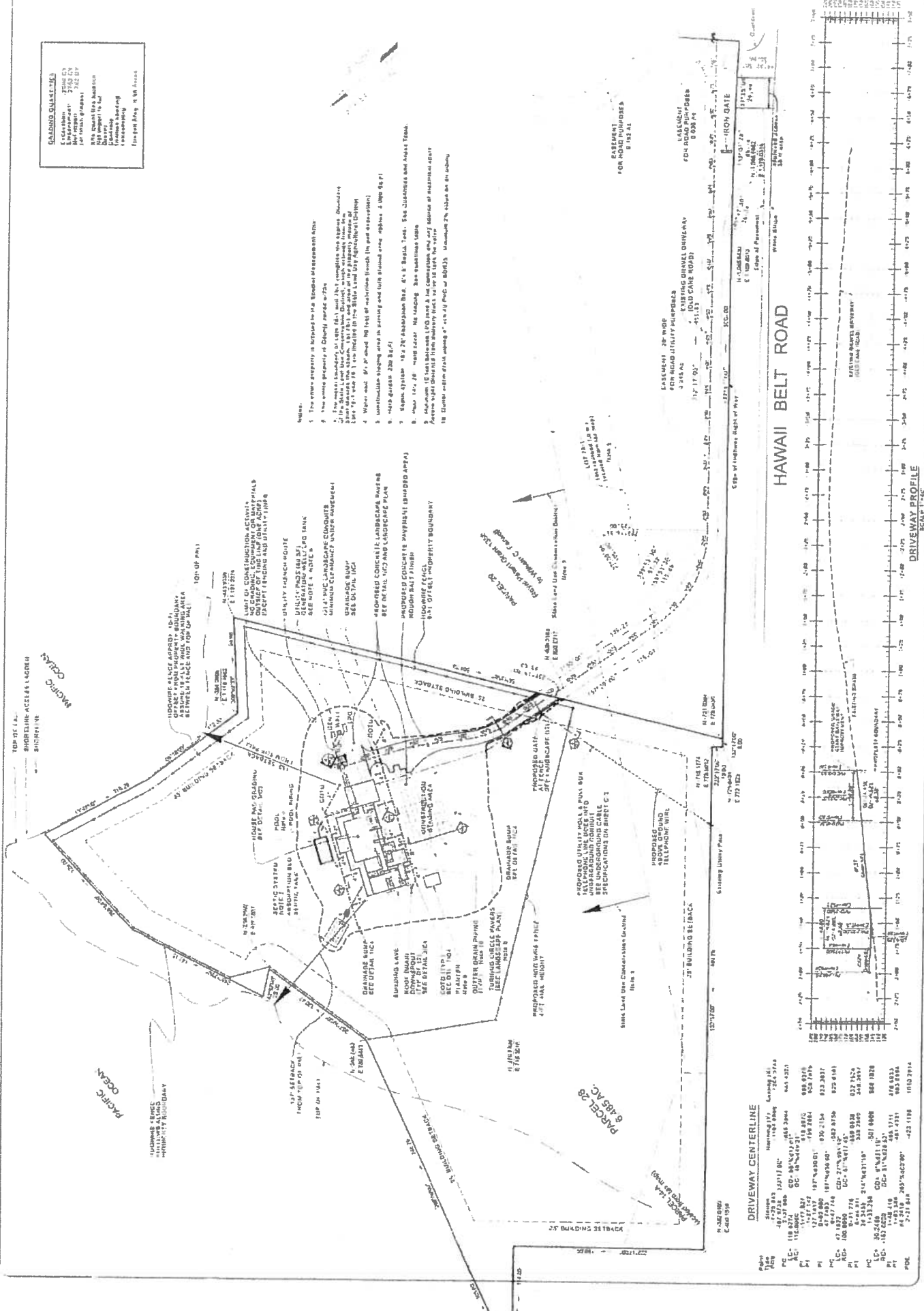
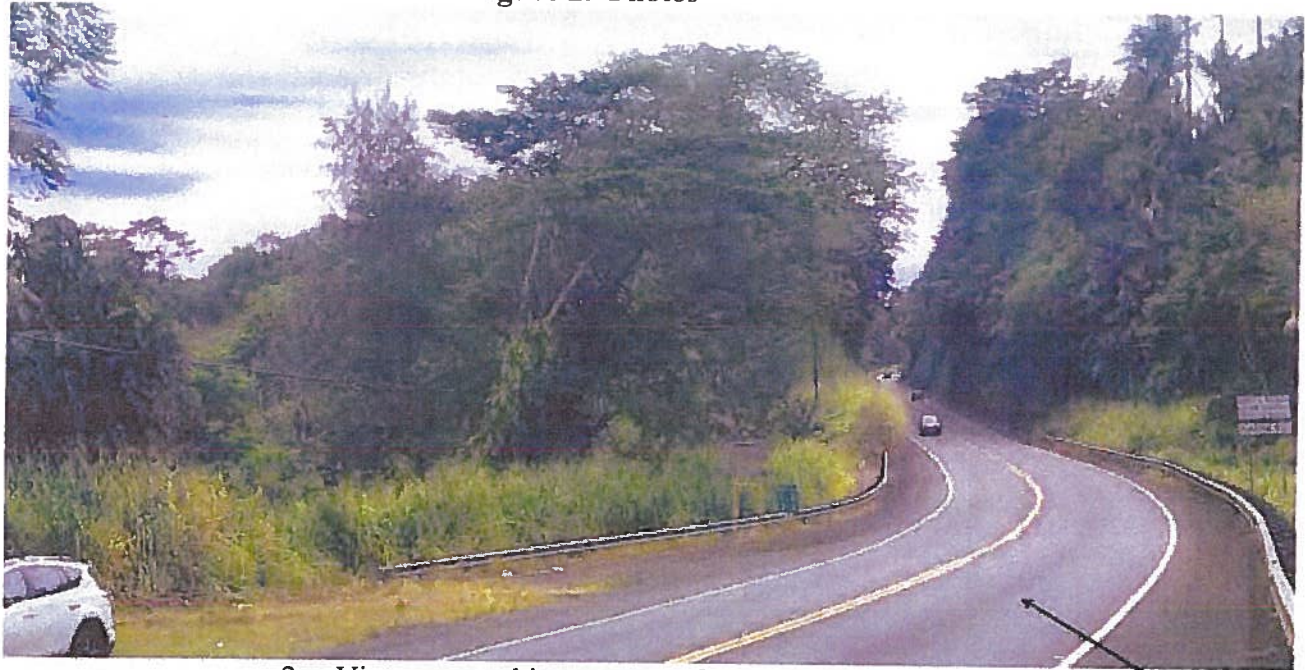


EXHIBIT C

Figure 2. Photos



2c. View approaching property from north ▲
▼ 2d. View approaching property from south

Highway 19



Highway 19

A/C paved pull-out

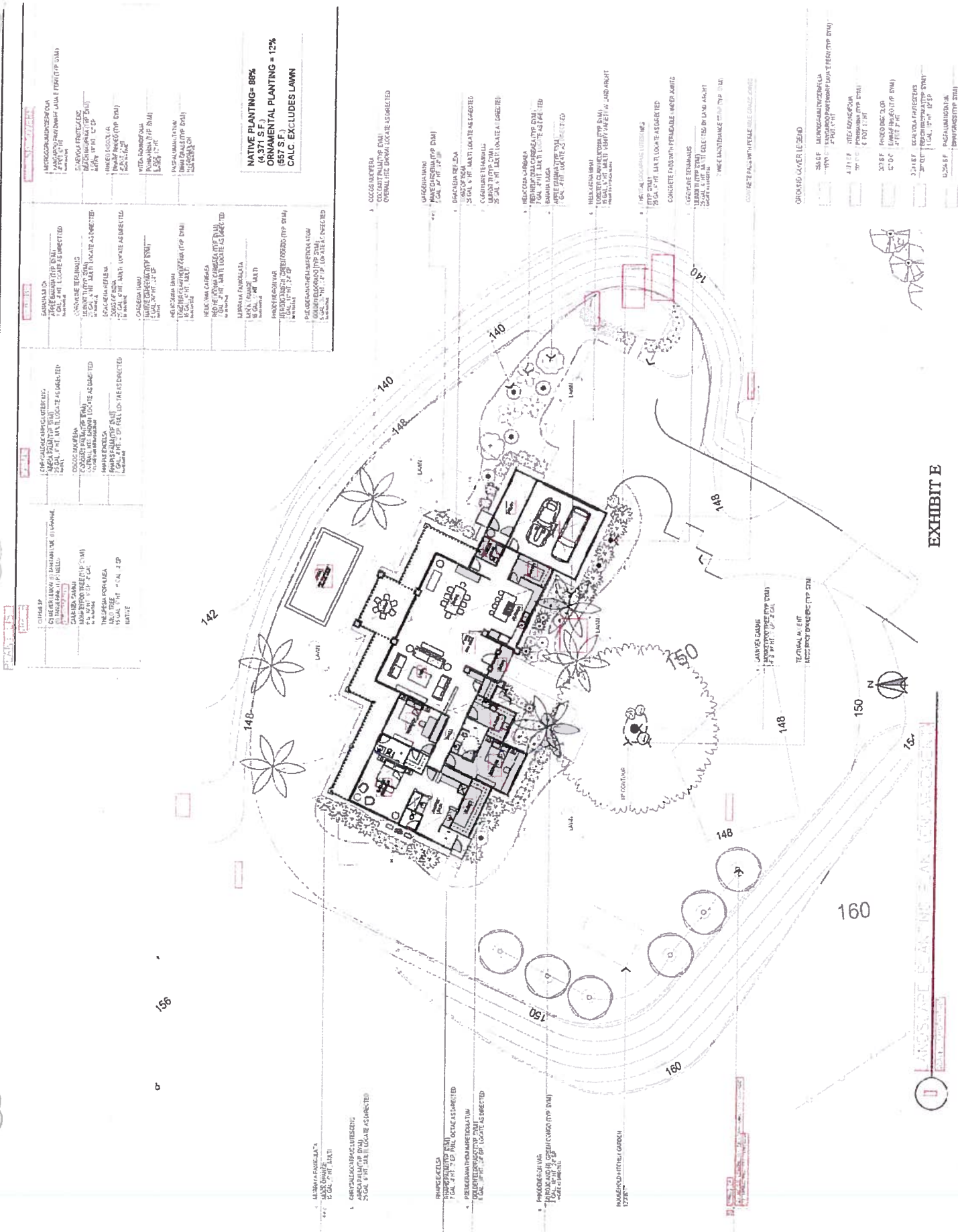


EXHIBIT E

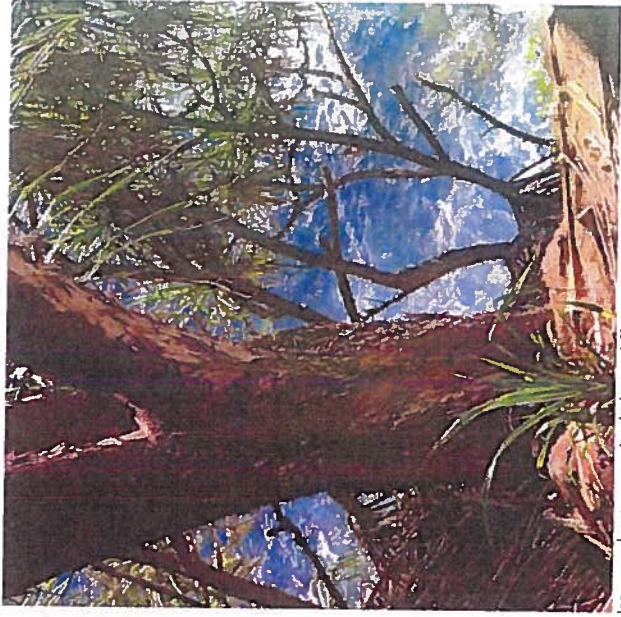
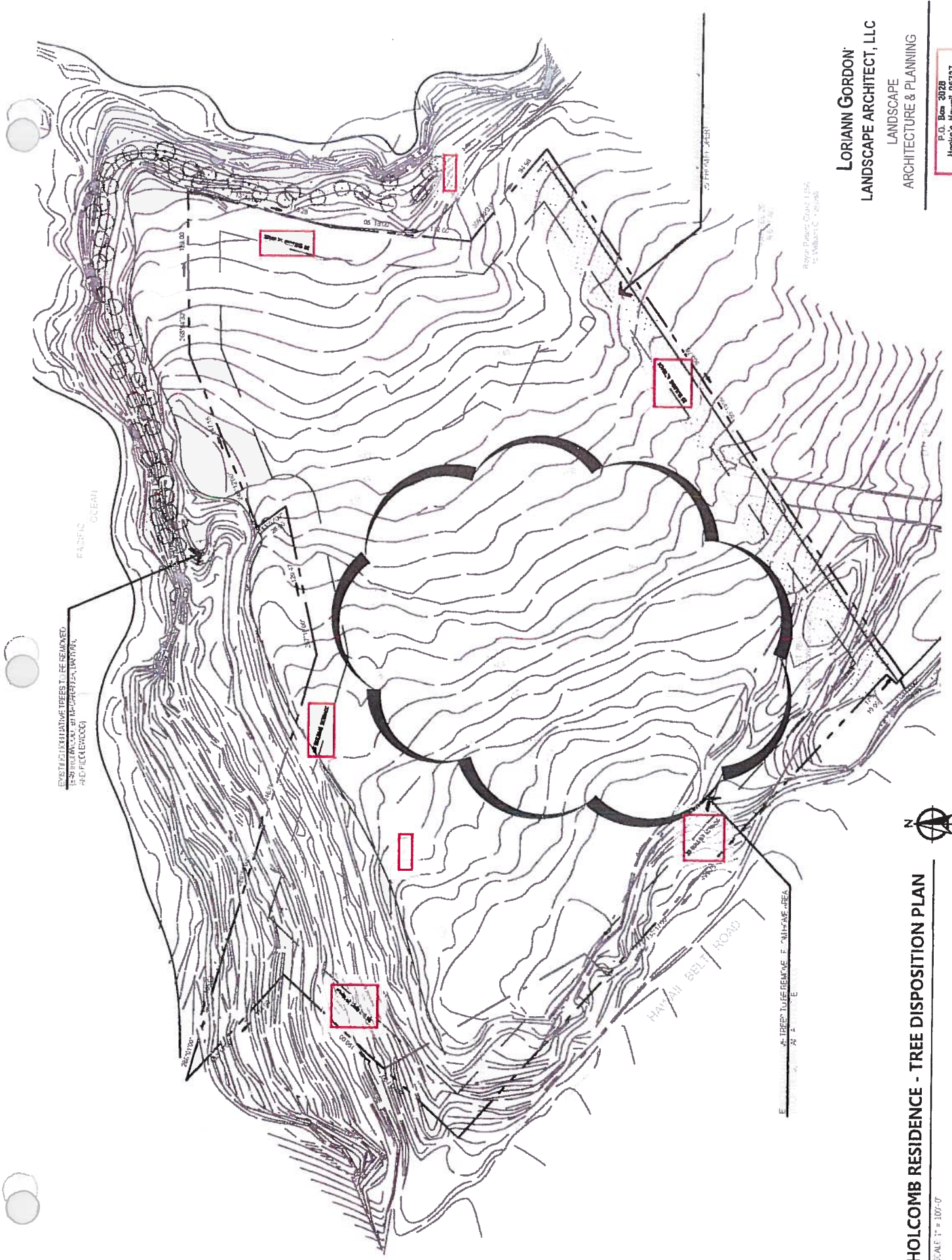


EXHIBIT F



EXISTING TREES TO BE REMOVED
(SHOWN WITH RED BOXES)



HOLCOMB RESIDENCE - TREE DISPOSITION PLAN

SCALE 1" = 100'-0"

LORIANN GORDON
LANDSCAPE ARCHITECT, LLC
 LANDSCAPE
 ARCHITECTURE & PLANNING

P.O. Box 3028
 Honolulu, Hawaii 96727
 Tel: (808) 934-7363
 Website: www.lgordonllc.com

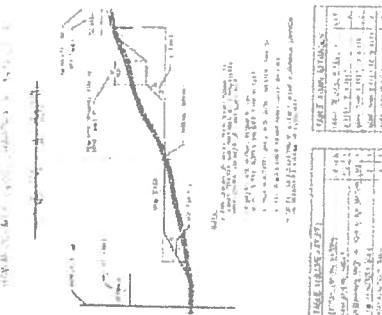
STUDY WITH

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CODES OF UNLESS
OF THE PUBLIC WORKS, STANDARD DETAILS FOR THE COUNTY OF HAVILL
CONSTRUCTION SPECIFIC, STANDARD DETAILS FOR THE COUNTY OF HAVILL
CONSTRUCTION SPECIFIC, 1985, 1987, 1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021, 2023, 2025, 2027, 2029, 2031, 2033, 2035, 2037, 2039, 2041, 2043, 2045, 2047, 2049, 2051, 2053, 2055, 2057, 2059, 2061, 2063, 2065, 2067, 2069, 2071, 2073, 2075, 2077, 2079, 2081, 2083, 2085, 2087, 2089, 2091, 2093, 2095, 2097, 2099, 2101, 2103, 2105, 2107, 2109, 2111, 2113, 2115, 2117, 2119, 2121, 2123, 2125, 2127, 2129, 2131, 2133, 2135, 2137, 2139, 2141, 2143, 2145, 2147, 2149, 2151, 2153, 2155, 2157, 2159, 2161, 2163, 2165, 2167, 2169, 2171, 2173, 2175, 2177, 2179, 2181, 2183, 2185, 2187, 2189, 2191, 2193, 2195, 2197, 2199, 2201, 2203, 2205, 2207, 2209, 2211, 2213, 2215, 2217, 2219, 2221, 2223, 2225, 2227, 2229, 2231, 2233, 2235, 2237, 2239, 2241, 2243, 2245, 2247, 2249, 2251, 2253, 2255, 2257, 2259, 2261, 2263, 2265, 2267, 2269, 2271, 2273, 2275, 2277, 2279, 2281, 2283, 2285, 2287, 2289, 2291, 2293, 2295, 2297, 2299, 2301, 2303, 2305, 2307, 2309, 2311, 2313, 2315, 2317, 2319, 2321, 2323, 2325, 2327, 2329, 2331, 2333, 2335, 2337, 2339, 2341, 2343, 2345, 2347, 2349, 2351, 2353, 2355, 2357, 2359, 2361, 2363, 2365, 2367, 2369, 2371, 2373, 2375, 2377, 2379, 2381, 2383, 2385, 2387, 2389, 2391, 2393, 2395, 2397, 2399, 2401, 2403, 2405, 2407, 2409, 2411, 2413, 2415, 2417, 2419, 2421, 2423, 2425, 2427, 2429, 2431, 2433, 2435, 2437, 2439, 2441, 2443, 2445, 2447, 2449, 2451, 2453, 2455, 2457, 2459, 2461, 2463, 2465, 2467, 2469, 2471, 2473, 2475, 2477, 2479, 2481, 2483, 2485, 2487, 2489, 2491, 2493, 2495, 2497, 2499, 2501, 2503, 2505, 2507, 2509, 2511, 2513, 2515, 2517, 2519, 2521, 2523, 2525, 2527, 2529, 2531, 2533, 2535, 2537, 2539, 2541, 2543, 2545, 2547, 2549, 2551, 2553, 2555, 2557, 2559, 2561, 2563, 2565, 2567, 2569, 2571, 2573, 2575, 2577, 2579, 2581, 2583, 2585, 2587, 2589, 2591, 2593, 2595, 2597, 2599, 2601, 2603, 2605, 2607, 2609, 2611, 2613, 2615, 2617, 2619, 2621, 2623, 2625, 2627, 2629, 2631, 2633, 2635, 2637, 2639, 2641, 2643, 2645, 2647, 2649, 2651, 2653, 2655, 2657, 2659, 2661, 2663, 2665, 2667, 2669, 2671, 2673, 2675, 2677, 2679, 2681, 2683, 2685, 2687, 2689, 2691, 2693, 2695, 2697, 2699, 2701, 2703, 2705, 2707, 2709, 2711, 2713, 2715, 2717, 2719, 2721, 2723, 2725, 2727, 2729, 2731, 2733, 2735, 2737, 2739, 2741, 2743, 2745, 2747, 2749, 2751, 2753, 2755, 2757, 2759, 2761, 2763, 2765, 2767, 2769, 2771, 2773, 2775, 2777, 2779, 2781, 2783, 2785, 2787, 2789, 2791, 2793, 2795, 2797, 2799, 2801, 2803, 2805, 2807, 2809, 2811, 2813, 2815, 2817, 2819, 2821, 2823, 2825, 2827, 2829, 2831, 2833, 2835, 2837, 2839, 2841, 2843, 2845, 2847, 2849, 2851, 2853, 2855, 2857, 2859, 2861, 2863, 2865, 2867, 2869, 2871, 2873, 2875, 2877, 2879, 2881, 2883, 2885, 2887, 2889, 2891, 2893, 2895, 2897, 2899, 2901, 2903, 2905, 2907, 2909, 2911, 2913, 2915, 2917, 2919, 2921, 2923, 2925, 2927, 2929, 2931, 2933, 2935, 2937, 2939, 2941, 2943, 2945, 2947, 2949, 2951, 2953, 2955, 2957, 2959, 2961, 2963, 2965, 2967, 2969, 2971, 2973, 2975, 2977, 2979, 2981, 2983, 2985, 2987, 2989, 2991, 2993, 2995, 2997, 2999, 3001, 3003, 3005, 3007, 3009, 3011, 3013, 3015, 3017, 3019, 3021, 3023, 3025, 3027, 3029, 3031, 3033, 3035, 3037, 3039, 3041, 3043, 3045, 3047, 3049, 3051, 3053, 3055, 3057, 3059, 3061, 3063, 3065, 3067, 3069, 3071, 3073, 3075, 3077, 3079, 3081, 3083, 3085, 3087, 3089, 3091, 3093, 3095, 3097, 3099, 3101, 3103, 3105, 3107, 3109, 3111, 3113, 3115, 3117, 3119, 3121, 3123, 3125, 3127, 3129, 3131, 3133, 3135, 3137, 3139, 3141, 3143, 3145, 3147, 3149, 3151, 3153, 3155, 3157, 3159, 3161, 3163, 3165, 3167, 3169, 3171, 3173, 3175, 3177, 3179, 3181, 3183, 3185, 3187, 3189, 3191, 3193, 3195, 3197, 3199, 3201, 3203, 3205, 3207, 3209, 3211, 3213, 3215, 3217, 3219, 3221, 3223, 3225, 3227, 3229, 3231, 3233, 3235, 3237, 3239, 3241, 3243, 3245, 3247, 3249, 3251, 3253, 3255, 3257, 3259, 3261, 3263, 3265, 3267, 3269, 3271, 3273, 3275, 3277, 3279, 3281, 3283, 3285, 3287, 3289, 3291, 3293, 3295, 3297, 3299, 3301, 3303, 3305, 3307, 3309, 3311, 3313, 3315, 3317, 3319, 3321, 3323, 3325,

 $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

4. IN ALL OTHER AREAS EMPLOYED ALL FILL MATERIAL TO BE PLACED IN A TIGHT MANNER (11),
5. IN ALL OTHER AREAS EMPLOYED ALL FILL MATERIAL TO BE PLACED IN A TIGHT MANNER (11),

GRADING SLOPE & FEEDBACK REQUIREMENTS



5475/14-47012.5

- [illegible]

SHGRI VJILJ7JN 13IV76B602P7F16N

TABLE 5. Specific values for interaction with atmospheric sulphuric acid
Charged cable failure.

125.11160.1

Partners should be included in each coalition run.

16.9.93 18.11.93 19.11.93 20.11.93 21.11.93 22.11.93 23.11.93 24.11.93 25.11.93 26.11.93 27.11.93 28.11.93 29.11.93 30.11.93 31.12.93

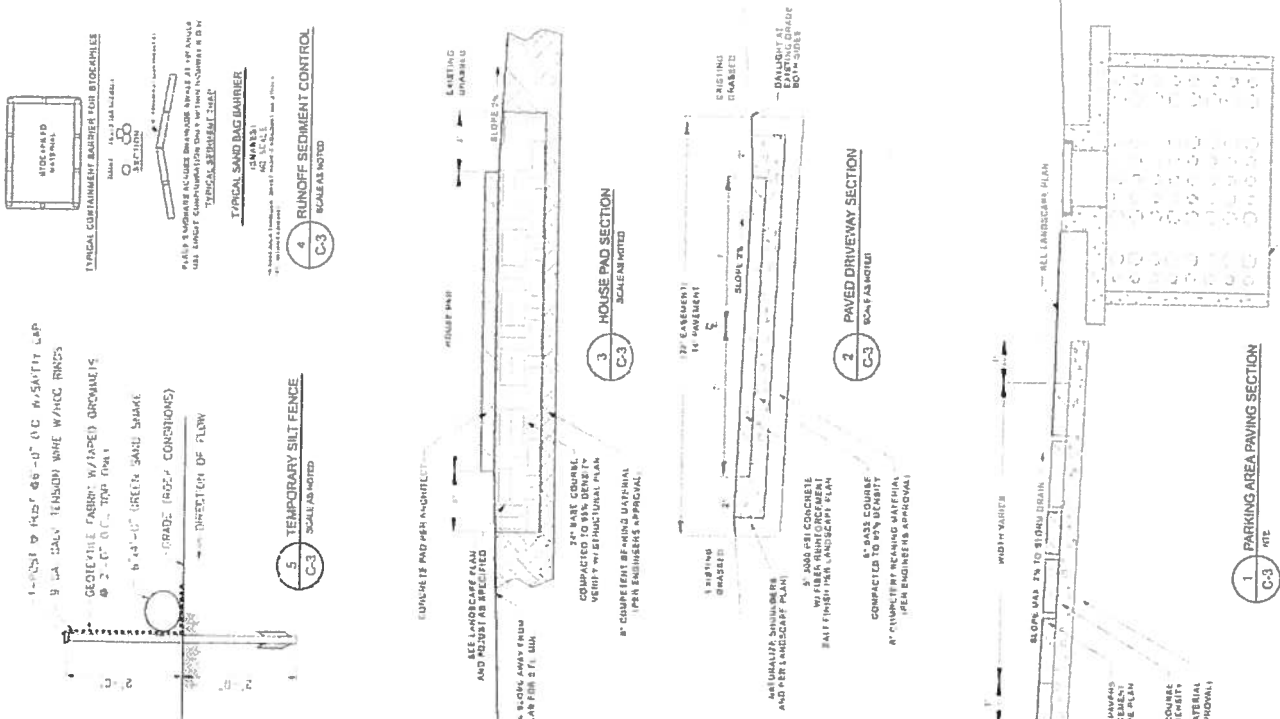
THE NEW KALAMUS FOR MATHS: BEYOND COMMUNITY AND MODERNITY

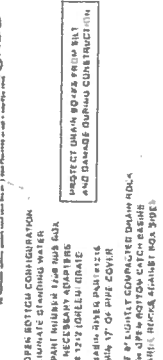
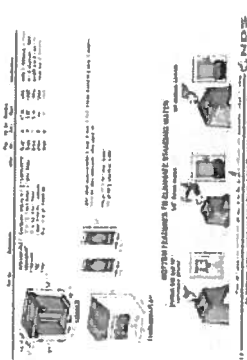
INSTITUTIONAL

by these arguments should be at least 10% up the scale on the basis of the

אנחנו מודים לך על כל המאמץ והעזרה שאתה נותנת לנו, ונודה לך על כל המאמץ והעזרה שאתה נותנת לנו.

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0893-3200/87 \$12.00 DOI: 10.1037/0893-3200.1.1.6





Biological Survey, TMK (3) 2-8-012:028 South Hilo District, Island of Hawai'i

By Ron Terry, Ph.D.
Geometrician Associates, LLC
August 2020

Introduction

This biological survey concerns portions of a shoreline property formerly cultivated in sugar cane and now in a semi-forested condition. The 6.485-acre property identified by TMK 2-8-012:028 is located near the town of Honomū on the Island of Hawai'i, as shown on Figure 1a (the "property"). Included for purposes of analysis is an access easement that extends about 600 feet through TMK 2-8-012:029 from the highway to the edge of the subject property.

Kelly Holcomb, the owner of the property, plans to build a single-family home and conduct related accessory uses on the property, including utilities, a driveway and turnaround, and cutting overgrown vegetation and conducting minor surface restoration for an easement along an old cane road access from Highway 19 to the property boundary. The property is illustrated in Figure 1. Although the property was formerly in sugar cane, it is within the State Land Use Conservation District. In order to conduct these development activities on the property responsibly, it is important to locate any sensitive species or vegetation types, identify the potential for biological impacts, and develop mitigation measures to avoid or reduce impacts to minimal levels.

The property was surveyed by Ron Terry on portions of two days in August 2020. The objectives of the botanical survey component of the survey were to: 1) describe the vegetation; 2) list all species encountered; and 3) identify the locations of any individual plants of rare, threatened or endangered species. Plant species were identified in the field and, as necessary, collected and keyed out in the laboratory. Special attention was given to the possible presence of any federally listed (USFWS 2020) threatened or endangered plant species, although the habitat did not indicate a high potential for their presence. The faunal portion of the survey consisted of visual/auditory faunal surveys both during and apart from the botanical survey covering birds and introduced mammals, reptiles, or amphibians. Also considered during the survey was the general value of the habitat for native birds and the Hawaiian hoary bat. Not included in the survey were invertebrates or aquatic species, although it should be noted that no lakes, ponds or intermittent or permanent streams were observed or are known to be present (Honomū Stream passes just west of the property). As with all coastal locations, protection of marine water quality through strict adherence to sediment and erosion Best Management Practices is necessary and expected to be required.

Vegetation Type and Influences

Geologically, this part of the island is located on the lower flank of Mauna Kea volcano. The surface consists of weathered soils derived from regional ash deposits and alkalic

basalt lava flows dated at 65,000-200,000 years before the present (Wolfe and Morris 1996). Elevations on the useable part of this moderately sloping shoreline property drop from about 165 to 80 feet above sea level, seaward of which there are 50- to 80-foot tall sea cliffs. The property receives an average annual rainfall of about 132 inches (Giambelluca et al 2013). The project site soil is classified by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) as Hilo hydrous silty clay loam, 10 to 20 percent slopes. This soil is formed from ash fields on lava flows and if irrigated can be considered prime farmland. This type of soil was formerly used mostly for sugarcane cultivation (U.S. Soil Conservation Service 1973) and now supports diversified agriculture, secondary forest, or pasture.

In the *Manual of the Flowering Plants of the Hawaiian Islands*, Gagne and Cuddihy (1990) classified the natural, pre-human vegetation in areas with similar geology, elevation and rainfall as Lowland Wet Forest. Dominant species were likely 'ōhi'a trees (*Metrosideros polymorpha*), hala (*Pandanus tectorius*), uluhe (*Dicranopteris linearis*) and hapu'u ferns (*Cibotium* spp.), and a large variety of trees, shrubs, ferns, sedges, grasses and herbs. Shoreline cliff fringes likely contained hala, naupaka (*Scaevola taccada*), 'ōhi'a, and nanea (*Vigna marina*).

This original community in the general area was long ago eradicated or heavily degraded by sugar cane cultivation, cattle grazing, and clearing for small farms and residences. The vegetation outside towns in the area is now either managed (i.e., farms, pasture or landscaped grounds) or adventive "communities" of various alien weeds. Small remnants of native forest remain only in the far mauka areas, on sea cliffs, and on the sides of some gulches.

U.S. Department of Agriculture and Geological Survey airphotos from 1954, 1965 and 1977 indicate that virtually the entire property was formerly cultivated in sugar cane. After the cessation of sugar cane cultivation in the 1980s, the property was reportedly used for pasture and pigs. Tree cover has rapidly increased on the property since that time and now makes up over half the vegetation cover, although sections dominated by various grasses still persist (Figure 3).

Results: Vegetation and Flora

As shown in Figure 1a, a Google Earth© image of the property from 2019; in Figure 1b, an oblique digital drone aerial image; and in the ground photos in Figure 2, the property is semi-forested. Over most of the property away from the seacliffs, a wide variety of robust grasses dominate the grass layer, including guinea grass (*Megathyrsus maximus*), California grass (*Urochloa mutica*) and Lyon's grass and (*Themeda villosa*), as well as smaller grasses, especially crabgrasses (*Digitaria* spp.) (Figure 2a). The tree layer is dominated by fiddlewood (*Citharexylum caudatum*), common guava (*Psidium guajava*), African tulip (*Spathodea campanulata*), and Alexander palms (*Archontophoenix alexandrae*), although many other tree species are present, notably gunpowder tree (*Trema orientalis*), macaranga (*Macaranga mappa*), albizia (*Falcataria moluccana*) and Chinese banyan (*Ficus microcarpa*) (Figures 2b-c). In forested areas there is a variable understory consisting of tree saplings, shrubs, herbs, ferns and vines, almost all of them alien. Most represented are the shrubs Asian melastome (*Melastoma candidum*),

strawberry guava (*Psidium cattleianum*) and night-blooming jasmine (*Cestrum nocturnum*); the herbs rattlepod (*Crotalaria* spp.) and Koster's curse (*Clidemia hirta*); and the vines pilau maile (*Paederia foetida*) and white thunbergia (*Thunbergia fragrans*). One native shrub is found sparingly but prominently: neneleau (*Rhus sandwicensis*). This attractive native sumac is present in a few areas, especially surrounding the easement (Figure 2d). Ferns vary with the micro-environment and are all aliens (Figure 2e). The downy wood fern (*Christella dentata*) and sword fern (*Nephrolepis multiflora*) are present in and around pastures, while shadier margins and forests support warabi (*Diplazium esculentum*) and *Blechnum appendiculatum*. Trees have several epiphytic ferns including maile-scented fern (*Phymatosorus grossus*) and golden polypody (*Phlebodium aureum*). The shady cliff edges and several of the deep cuts formed by natural slumping or the railroad cut support maidenhair fern (*Adiantum raddianum*) and holly fern (*Cyrtomium falcatum*).

The cliffs exhibit a different vegetation than the rest of the property (Figure 2f). It still includes fiddlewood – the dominant tree of the rest of the property – as well as Chinese fan palm (*Livistona chinensis*), warabi ferns, and various other plants, but is dominated by ironwood (*Casuarina equisetifolia*) and the natives hala, naupaka and nanea (*Vigna marina*). The understory includes tree seedlings and herbs but is generally covered by a thick layer of ironwood needles. Ironwoods suppress native vegetation and contribute to slope instability. While natives act to stabilize the slopes, ironwood trunks and branches capture the wind like a sail and their roots act as levers, forcing out boulders. Ironwood needles tend to function as a blanket and suppress the growth of the natives.

All plant species found on the property during the survey are listed in Table 1. Of the 74 species detected, 6 were indigenous (native to the Hawaiian Islands and elsewhere), while only one – neneleau – was endemic (found only in the Hawaiian Islands). Each of the indigenous plants is very common throughout the Hawaiian Islands and elsewhere, and no rare or unusual native plant species were present. Two common Polynesian introductions were also present: ti (*Cordyline fruticosa*) and 'awapuhi (*Zingiber zerumbet*). It should be noted that we were not able to identify several species because they were sterile, juvenile and/or in poor condition. It is highly unlikely that any of these unidentified species would be rare.

Results: Threatened and Endangered Plant Species and Critical Habitat

No threatened or endangered plant species as listed by the U.S. Fish and Wildlife Service (2020) appear to be present on the property, nor are there uniquely valuable habitats. No existing or proposed federally designated terrestrial critical habitat for plants (or animals) is present on or near the property.

Botanical Impacts and Recommended Mitigation Measures

The history of continuous disturbance coupled with a location in the lowlands has resulted in a flora and vegetation on most of the property that has little value in terms of conserving native vegetation or threatened or endangered plant species. In general, no adverse botanical impacts are expected as a result of developing a single-family home and accessory uses, including the proposed driveway re-establishment on the old cane

road. It is recommended that native plants such as hala, naupaka and neneleau be preserved where practical and be included in a landscape plan focused on native elements, as is encouraged by Conservation District rules.

Results: Birds

A total of eight bird species were observed during the botanical surveys and the specific bird observation periods, all of them common non-natives of urban, suburban and rural areas (see Table 2).

Although not seen in the survey, only the Hawaiian hawk (*Buteo solitarius*) among all native forest birds is likely to have much of a presence on this low-elevation property. The Hawaiian hawk generally prefers 'ōhi'a forest habitat but is known from both native and non-native forests. It occurs throughout the island of Hawai'i from sea level to 8,530 feet in elevation. Hawks often forage in forests near agricultural tracts and nest in tall trees of a variety of species. Most nesting occurs in native 'ōhi'a trees, although hawks may also nest in non-native trees, including eucalyptus, ironwood, mango, coconut palm and macadamia. Nest construction is protracted, beginning up to two months before the first egg is laid and continuing into the nestling period. Egg-laying generally occurs from March to June, with fledging from July to September. Both sexes contribute to nest-building. Clutch size is nearly always one, although clutches of two and three have been reported. Both sexes incubate, although females perform most of the brooding of nestlings; males provide most of the food to chicks and female. Both adults feed fledglings, which are dependent on adults for up nine months.

Given the vegetation context, there is a small but not negligible possibility that hawks could nest on or near the property. If nests were near enough, any grading, tree removal or other construction activities might disturb nesting, although the context adjacent to several farms and a highway utilized by large trucks somewhat reduced the likelihood of both nests and disturbance potential.

A number of native forest birds occur in the uplands of Hilo-Hāmākua-Kohala above 3,000 feet in elevation. These include honeycreepers such as the 'apapane (*Himatione sanguinea*) and 'amakihi (*Chlorodrepanis virens*), the monarch flycatcher 'elepaio (*Chasiempis sandwichensis*), and the thrush 'ōma'o (*Myadestes obscurus*). All of these species generally require 'ōhi'a forest. Bird survey work on the eastern end of the Island of Hawai'i documented in Spiegel et al. (2006) indicate that in many lowland forests, 'amakihi are the most common and widespread native birds and are significantly associated with 'ōhi'a. These lowland 'ōhi'a forests can also support endangered Hawaiian hawks, which forage in forests nearby agricultural tracts and nest in tall trees. At low elevations there has been widespread recovery of both these species and a changing composition of the forest bird community; nevertheless, lowlands dominated by non-native vegetation and bird species continue to have very few forest birds. Rarer native forest bird species are only found in the montane forests along the Hāmākua Coast outside the mosquito belt (generally above 4,000 feet in elevation), where native plant resources are still present and *Culex* mosquitos are absent or scarce. These birds include the threatened 'i'iwi (*Drepanis coccinea*), as well as the endangered 'akiapōlā'au (*Hemignathus munroi*), Hawai'i creeper (*Loxops mana*) and Hawai'i 'akepa (*Loxops*

coccineus). Although it is possible that 'amakihi, which have been seen in lowland ironwood groves in Puna, might occasionally be present, all of the other Hawaiian forest birds would be extremely unlikely to occur on this property.

The endangered Hawaiian goose or nēnē (*Branta sandwicensis*) has become very common on many Hawaiian islands and can be found at elevations ranging from sea level to sub-alpine areas above 7,000 feet. Historically, flocks moved between high-elevation feeding habitats and lowland nesting areas. Nests consist of a shallow scrape lined with plant material and down. Breeding pairs usually return to the previous year's nest site, typically in dense vegetation. Nēnē have an extended breeding season, and nesting may occur in all months except May, June, and July, meaning that even if nēnē were present they would not be nesting. Because of the lack of water bodies, the property appeared to be unlikely habitat for nēnē and particularly for nesting. We did not observe any signs of nēnē, although they are perhaps occasionally present.

It is also likely that a number of migratory shorebirds and one seabird are present on the cliffs and rocky tidepools just makai of the property. These would include the migratory birds wandering tattler or 'ulili (*Tringa incana*), the ruddy turnstone or 'akekeke (*Arenaria interpres*), and the Pacific golden-plover or kolea (*Pluvialis fulva*), as well as the seabird black noddy (*Anous minutus melanogenys*), which may nest in the cliffs below the property. The proposed actions would not affect these birds.

As with all of the island of Hawai'i, several listed seabirds may overfly the Honomū area between the months of May and November, including the endangered Hawaiian petrel (*Pterodroma sandwichensis*), the endangered band-rumped storm petrel (*Oceanodroma castro*), and the threatened Newell's shearwater (*Puffinus auricularis newelli*). These seabirds hunt over the ocean during the day and fly to higher elevations at night to nest. The Hawaiian petrel was formerly common on the Island of Hawai'i. This pelagic seabird reportedly nested in large numbers on the slopes of Mauna Loa and in the saddle area between Mauna Loa and Mauna Kea, as well as at the mid-to-high elevations of Hualālai. It has within recent historic times been reduced to relict breeding colonies located at high elevations on Mauna Loa, Kohala and, possibly, Hualālai. The Hawaiian petrel (as well as the band-rumped storm petrel) generally nest on the Big Island well above 5,000 feet in elevation. Some Hawaiian petrel nests have recently been found at lower elevations on Kohala volcano. Both the Newell's shearwater and Hawaiian petrel are known to burrow under ferns on forested mountain slopes. These burrows are used year after year, usually by the same pair of birds. Although capable of climbing shrubs and trees before taking flight, they need an open downhill flight path through which they can become airborne. Although once abundant on all the main Hawaiian islands, most Newell's shearwater colonies today are found in the steep terrain between 500 to 2,300 feet on Kaua'i. Band-rumped storm petrels have recently been discovered to be nesting on the Mauna Loa side of the saddle between this mountain and Mauna Kea. Although each of these seabirds may fly over on their way to and from mountain nesting areas and the open ocean, no suitable nesting habitat for any of them is present on the property.

The primary cause of mortality in these seabird species in Hawai'i is thought to be predation by alien mammals at the nesting colonies. Collision with man-made structures is another significant cause. Nocturnally flying seabirds, especially fledglings on their

way to sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with manmade structures and, if not killed outright, become easy targets of predatory mammals including cats and mongooses.

Results: Mammals, Reptiles and Amphibians

It is highly likely that Hawaiian hoary bats (*Lasiurus cinereus semotus*), the only native Hawaiian land mammals, are sometimes present on the property. They have been found throughout the Hāmākua coast and in most areas on the island of Hawai‘i. Bats may forage for flying insects on the property on a seasonal basis and may also roost in trees and large shrubs. Bats are often visible while they are feeding on flying insects near dusk and dawn at various locations around the island of Hawai‘i. The presence of these bats can also be verified by ultrasound detectors or radar. If a bat is detected during a night’s study, this merely indicates that they were present in the area. Determination of bat populations or usage patterns requires much more sophisticated, long term studies. Conversely, the absence of bat detections does not indicate an absence of bats, which may have been absent for only a night, a week, or a season, or may have simply gone undetected. No bats were observed in our survey, which took place in full daylight and did not use any detection equipment. For the purposes of this assessment, it is assumed that Hawaiian hoary bats are present at least some of the time, as they have been frequently seen and detected by ultrasound and radar in ironwood, African tulip and groves of other species. Hawaiian hoary bats are vulnerable to disturbance during the summer pupping season and require special mitigation measures.

Only one non-native mammal was observed on the property, what appeared to be semi-feral pigs (*Sus scrofa*). It is likely that small Indian mongooses (*Herpestes a. auropunctatus*), mice (*Mus* spp.), rats (*Rattus* spp.), cats (*Felis catus*) and domestic dogs (*Canis f. familiaris*) are also sometimes present. None of these alien mammals have conservation value and all are deleterious to native flora and fauna.

There are no native terrestrial reptiles or amphibians in Hawai‘i. No reptiles were seen but there are probably various species of skink (Family: Scincidae) and gecko (Gekkonidae) present. The highly invasive coqui frogs (*Eleutherodactylus coqui*) was heard chirping at several locations. It is possible that bufo toads (*Bufo marinus*) and perhaps other amphibians are also present.

No invertebrate survey was undertaken as part of the survey, but in general, rare native invertebrates tend to be associated with native vegetation and are very unlikely to be present. No rare invertebrates would be expected from this property.

Faunal Impacts and Mitigation Measures

The following recommendations will help avoid impacts to endangered native birds and the Hawaiian hoary bat:

- To minimize impacts to the endangered Hawaiian hoary bat, trees taller than 15 feet should not be removed or trimmed during the bat birthing and pup rearing season (June 1 through September 15).

- To minimize impacts to Hawaiian hawks, avoid earthmoving within 100 meters of tall trees or any tree cutting during the breeding season for Hawaiian hawks (March through the end of September). If this time period cannot be avoided, arrange for a hawk nest search to be conducted by a qualified biologist. If hawk nests are present on or near the project site, all land clearing activity should cease until the expiration of the breeding season.
- If development activities incorporate outdoor lighting, they may attract endangered seabirds, which may become disoriented by the lighting, resulting in birds being downed. To avoid potential seabird downing through interaction with outdoor lighting, no construction or unshielded equipment lighting should be used after dark between the months of April and October. All permanent lighting should be shielded in strict conformance with the Hawai'i County Outdoor Lighting Ordinance (Hawai'i County Code Chapter 9, Article 14), which requires shielding of exterior lights so as to lower the ambient glare caused by unshielded lighting.

Report Limitations

No biological survey of a large area can claim to have detected every species present. Some plant species are cryptic in juvenile or even mature stages of their life cycle. Dry conditions can render almost undetectable plants that extended rainfall may later invigorate and make obvious. Thick brush can obscure even large, healthy specimens. Birds utilize different patches of habitat during different times of the day and seasons, and only long-term study can determine the exact species composition. The findings of this survey must therefore be interpreted with proper caution; in particular, there is no warranty as to the absence of any particular species.

Literature Cited or Consulted

- Banko, W. E. 1980. "Population Histories – Species Accounts Seabirds: Newell's Shearwater ('A'o)." Cooperative National Park Resources Studies Unit, University of Hawai'i at Manoa, Department of Botany, Technical Report #5A.
- Day, R. H., B. Cooper, and T. C. Telfer. 2003. *Decline of Townsend's (Newell's Shearwaters (Puffinus auricularis newelli) on Kauai, Hawaii*. The Auk 120: 669-679.
- Gagne, W., and L. Cuddihy. 1990. "Vegetation," pp. 45-114 in W.L. Wagner, D.R. Herbst, and S.H. Sohmer, eds., *Manual of the Flowering Plants of Hawai'i*. 2 vols. Honolulu: University of Hawai'i Press.
- Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte. 2013: Online Rainfall Atlas of Hawai'i. Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1.
- Spiegel, C.S., and P.J. Hart, B.L. Woodworth, E.J. Tweed and J.J. Lebrun. 2006. "Distribution and abundance of forest birds in low-altitude habitat on Hawai'i Island: evidence for range expansion of native species." *Bird Conservation International* 16:175–185.
- U.S. Fish and Wildlife Service (USFWS). 2020. *USFWS Threatened and Endangered Species System (TESS)*. Washington: GPO. http://ecos.fws.gov/tess_public/
- University of Hawai'i at Hilo, Dept. of Geography. 1998. *Atlas of Hawai'i*. 3rd ed. Honolulu: University of Hawai'i Press.
- Wolfe, E.W., and J. Morris. 1996. *Geologic Map of the Island of Hawai'i*. USGS Misc Investigations Series Map i-2524-A. Washington, D.C.: U.S. Geological Survey.

Figure 1a. Property Map

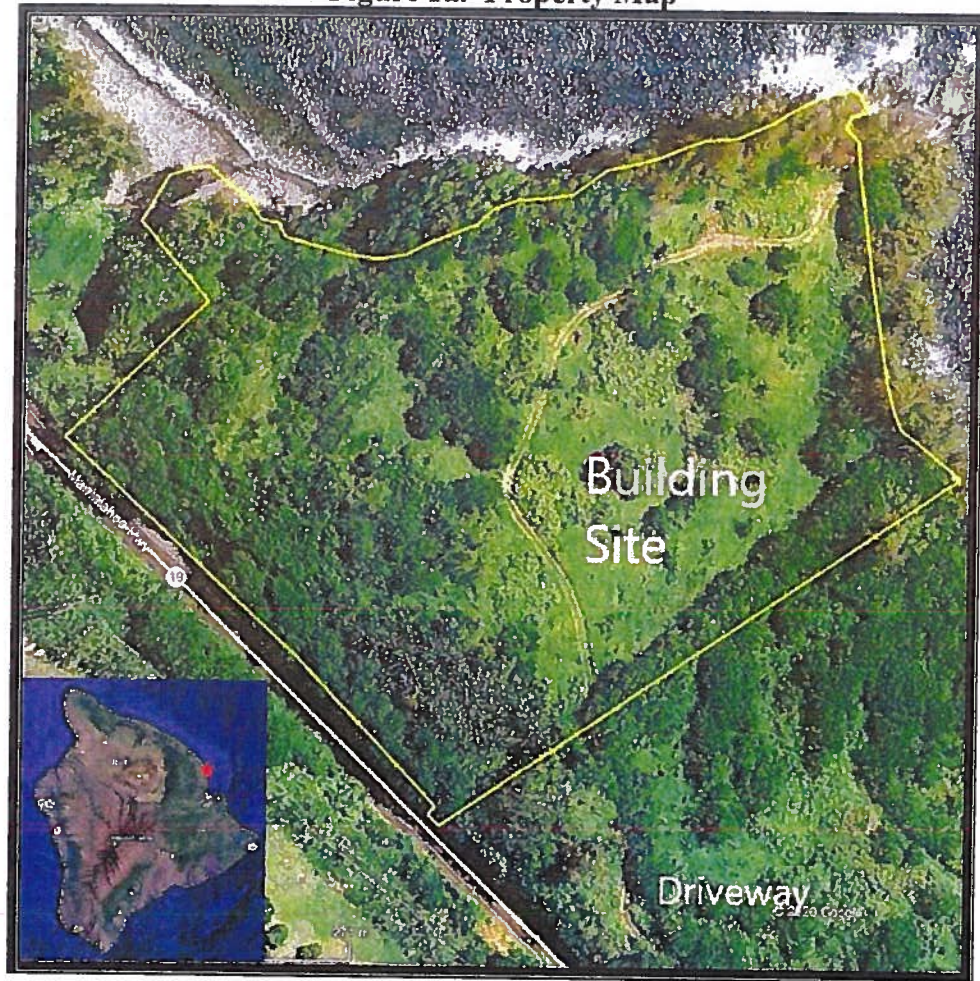


Figure 1b. Drone Oblique Aerial Image



Figure 2. Property Vegetation Photos



2a. Grass dominates the center of the property ▲

▼ 2b. Forest of alien species, dominated by fiddlewood



Figure 2. Property Vegetation Photos



2c. A dense forest of ferns is present in old railroad cut ▲
▼ 2d. Native neneleau



Figure 2. Property Vegetation Photos



2e. Ferns on cliff banks ▲

▼ 2f. Looking down edge of cliff at ironwood, hala and naupaka



Table 1. Plants Observed on Property

Scientific Name	Family	Common Name	Life Form	Status*
<i>Adiantum raddianum</i>	Pteridaceae	Maidenhair Fern	Fern	A
<i>Alpinia zerumbet</i>	Zingiberaceae	Shell Ginger	Herb	A
<i>Archontophoenix alexandrae</i>	Arecaceae	Alexander Palm	Tree	A
<i>Begonia sp.</i>	Begoniaceae	Begonia	Herb	A
<i>Blechnum appendiculatum</i>	Blechnaceae	Blechnum	Fern	A
<i>Casuarina equisetifolia</i>	Casuarinaceae	Ironwood	Tree	A
<i>Centella asiatica</i>	Apiaceae	Asiatic Pennywort	Herb	A
<i>Cestrum nocturnum</i>	Solanaceae	Night Blooming Jasmine	Shrub	A
<i>Chamaecrista nictitans</i>	Fabaceae	Partridge Pea	Herb	A
<i>Chloris barbata</i>	Poaceae	Swollen Fingergrass	Grass	A
<i>Christella dentatus</i>	Thelypteridaceae	Downy Wood Fern	Fern	A
<i>Citharexylum caudatum</i>	Verbenaceae	Fiddlewood	Tree	A
<i>Clidemia hirta</i>	Melastomataceae	Clidemia	Herb	A
<i>Commelina diffusa</i>	Commelinaceae	Honohono	Herb	A
<i>Conyza bonariensis</i>	Asteraceae	Conyza	Herb	A
<i>Cordyline fruticosa</i>	Agavaceae	Ti	Shrub	PI
<i>Crotalaria incana</i>	Fabaceae	Smooth Rattlepod	Herb	A
<i>Crotalaria trichotoma</i>	Fabaceae	Curara Pea	Herb	A
<i>Cyperus halpan</i>	Cyperaceae	Sharp Edge Sedge	Herb	A
<i>Cyperus meyenianus</i>	Cyperaceae	Meyen's Flatsedge	Sedge	A
<i>Cyperus polystachyos</i>	Cyperaceae	Manyspike Flatsedge	Herb	I
<i>Cyrtomium falcatum</i>	Dryopteridaceae	Holly Fern	Fern	A
<i>Desmodium intortum</i>	Fabaceae	Desmodium	Vine	A
<i>Desmodium triflorum</i>	Fabaceae	Desmodium	Herb	A
<i>Dicranopteris linearis</i>	Gleicheniaceae	'Uluhe	Fern	I
<i>Digitaria ciliaris</i>	Poaceae	Henry's Crab Grass	Herb	A
<i>Diplazium esculentum</i>	Athyriaceae	Paca	Fern	A
<i>Dissotis rotundifolia</i>	Melastomataceae	Dissotis	Herb	A
<i>Emilia fosbergii</i>	Asteraceae	Flora's Paintbrush	Herb	A
<i>Eragrostis pectinacea</i>	Poaceae	Carolina Lovegrass	Herb	A
<i>Erechtites hieracifolia</i>	Asteraceae	Erechtites	Herb	A
<i>Falcataia moluccana</i>	Fabaceae	Albizia	Tree	A
<i>Ficus microcarpa</i>	Moraceae	Chinese Banyan	Tree	A
<i>Fimbristylis dichotoma</i>	Cyperaceae	Fimbristylis	Herb	I
<i>Hyptis pectinata</i>	Lamiaceae	Comb Hyptis	Shrub	A
<i>Ipomoea triloba</i>	Convolvulaceae	Little Bell	Vine	A
<i>Kyllinga brevifolia</i>	Cyperaceae	Kyllinga	Herb	A
<i>Lantana camara</i>	Verbenaceae	Lantana	Shrub	A
<i>Livistona chinensis</i>	Arecaceae	Chinese Fan Palm	Tree	A
<i>Macaranga mappia</i>	Euphorbiaceae	Bingabing	Shrub	A
<i>Megathyrus maximus</i>	Poaceae	Guinea Grass	Herb	A
<i>Melastoma sp.</i>	Melastomataceae	Melastoma	Shrub	A
<i>Melinis minutiflora</i>	Poaceae	Molasses Grass	Herb	A
<i>Miconia calvescens</i>	Melastomataceae	Miconia	Shrub	A
<i>Mimosa pudica</i>	Fabaceae	Sleeping Grass	Herb	A

<i>Momordica charantia</i>	Cucurbitaceae	Bitter Melon	Vine	A
<i>Nephrolepis multiflora</i>	Nephrolepidaceae	Sword Fern	Fern	A
<i>Paederia foetida</i>	Rubiaceae	Maile Pilau	Vine	A
<i>Pandanus tectorius</i>	Pandanaceae	Hala	Tree	I
<i>Paspalum conjugatum</i>	Poaceae	Hilo Grass	Herb	A
<i>Phlebodium aureum</i>	Polypodiaceae	Golden Polypody	Fern	A
<i>Phyllanthus debilis</i>	Euphorbiaceae	Niruri	Herb	A
<i>Phymatosorus grossus</i>	Polypodiaceae	Maile Scented Fern	Fern	A
<i>Pluchea carolinensis</i>	Asteraceae	Sourbush	Shrub	A
<i>Polygala paniculata</i>	Polygalaceae	Milkwort	Herb	A
<i>Psidium cattleianum</i>	Myrtaceae	Strawberry Guava	Tree	A
<i>Psidium guajava</i>	Myrtaceae	Guava	Tree	A
<i>Rhus sandwicensis</i>	Anacardiaceae	Neneleau	Tree	E
<i>Ricinus communis</i>	Euphorbiaceae	Castor Bean	Shrub	A
<i>Rubus rosifolius</i>	Rosaceae	Thimbleberry	Herb	A
<i>Sacciolepis indica</i>	Poaceae	Glenwood Grass	Herb	A
<i>Scaevola taccada</i>	Goodeniaceae	Naupaka Kahakai	Shrub	I
<i>Spathodea campanulata</i>	Bignoniaceae	African Tulip	Tree	A
<i>Sporobolus indicus</i>	Poaceae	Sporobolus	Herb	A
<i>Stachytarpheta jamaicensis</i>	Verbenaceae	Jamaican Vervain	Shrub	A
<i>Syzygium cumini</i>	Myrtaceae	Java Plum	Tree	A
<i>Themeda villosa</i>	Poaceae	Lyon's Grass	Herb	A
<i>Thunbergia fragrans</i>	Acanthaceae	White Thunbergia	Vine	A
<i>Tibouchina herbacea</i>	Melastomataceae	Cane Tibouchina	Herb	A
<i>Trema orientalis</i>	Ulmaceae	Gunpowder Tree	Tree	A
<i>Urochloa mutica</i>	Poaceae	California Grass	Herb	A
<i>Vigna marina</i>	Fabaceae	Nanea, Beach Pea	Vine	I
<i>Wedelia trilobata</i>	Asteraceae	Wedelia	Herb	A
<i>Zingiber zerumbet</i>	Zingiberaceae	'Awapuhi	Herb	PI

A=Alien PI= Polynesian Introduction E=Endemic I=Indigenous END=Federal and State Listed
Endangered

Table 2. List of Bird Species Observed on Property

Scientific Name	Common Name	Status
<i>Acridotheres tristis</i>	Common Myna	Alien Resident
<i>Geopelia striata</i>	Zebra Dove	Alien Resident
<i>Paroaria capitata</i>	Yellow-Billed Cardinal	Alien Resident
<i>Passer domesticus</i>	House Sparrow	Alien Resident
<i>Serinus mozambicus</i>	Yellow-Fronted Canary	Alien Resident
<i>Sicalis flaveola</i>	Saffron Finch	Alien Resident
<i>Streptopelia chinensis</i>	Spotted Dove	Alien Resident
<i>Zosterops japonicus</i>	Japanese White-Eye	Alien Resident

FINAL
COASTAL EROSION AND SHORELINE HAZARDS STUDY FOR
THE HOLCOMB PROPERTY.

Malamalama Iki Ahupua'a, Hāmākua District, Island of Hawai'i.

TMK: (3) 2-8-012:028.

Prepared by:

Timothy E. Scheffler, Ph.D.

and John P. Lockwood, Ph.D., CPG #9806

Prepared for:

Kelly Holcomb

c/o

Jason Knable

Carlsmith Ball, LLC

121 Waianuenue Avenue

Hilo, HI 96792

Tel: 808.935.6644

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EXHIBIT I

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Executive Summary

A geological survey of the Holcomb property was conducted in order to characterize geological structures and calculate a site-specific Average Annual Erosion Rate (AAER) for the shoreline. This report also identifies erosion prone areas and evaluates the risks posed by other potential hazards that could impact the property. This survey has been prepared in support of a Conservation District Use Permit Application (CDUA) and Environmental Assessment (EA) being prepared for the owner. John P. Lockwood, Ph.D., Certified Professional Geologist (#9806), served as Principal Investigator. The geological history of the subject property is explained. Historical photos of the coastline from 1954, 1965, 1977 and 2019 were evaluated for any measureable changes.

We conclude that the AAER cannot be measured with a high level of quantitative precision, but that the overall value is less than **0.2 feet/year** for the subject property. However, emphasis is placed on the episodic nature of cliff failures and the exacerbating influence of sea level rise on erosion processes.

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Introduction

Hawaii Administrative Rules concerning Conservation Districts (Title 13, Subtitle 1, Chapter 5, adopted August 12, 2011) state that applicants for Single Family Residential construction in coastal Conservation Districts must consider rates of coastal erosion affecting their properties in order to determine minimum shoreline setbacks for permitting. DLNR established a requirement that the Average Annual Coastal Erosion Rate must be determined, based on formal "Coastal Erosion Studies" which are to be carried out following the guidelines in the Hawaii Coastal Hazard Mitigation Guidebook (Hwang 2005). This report satisfies these requirements.

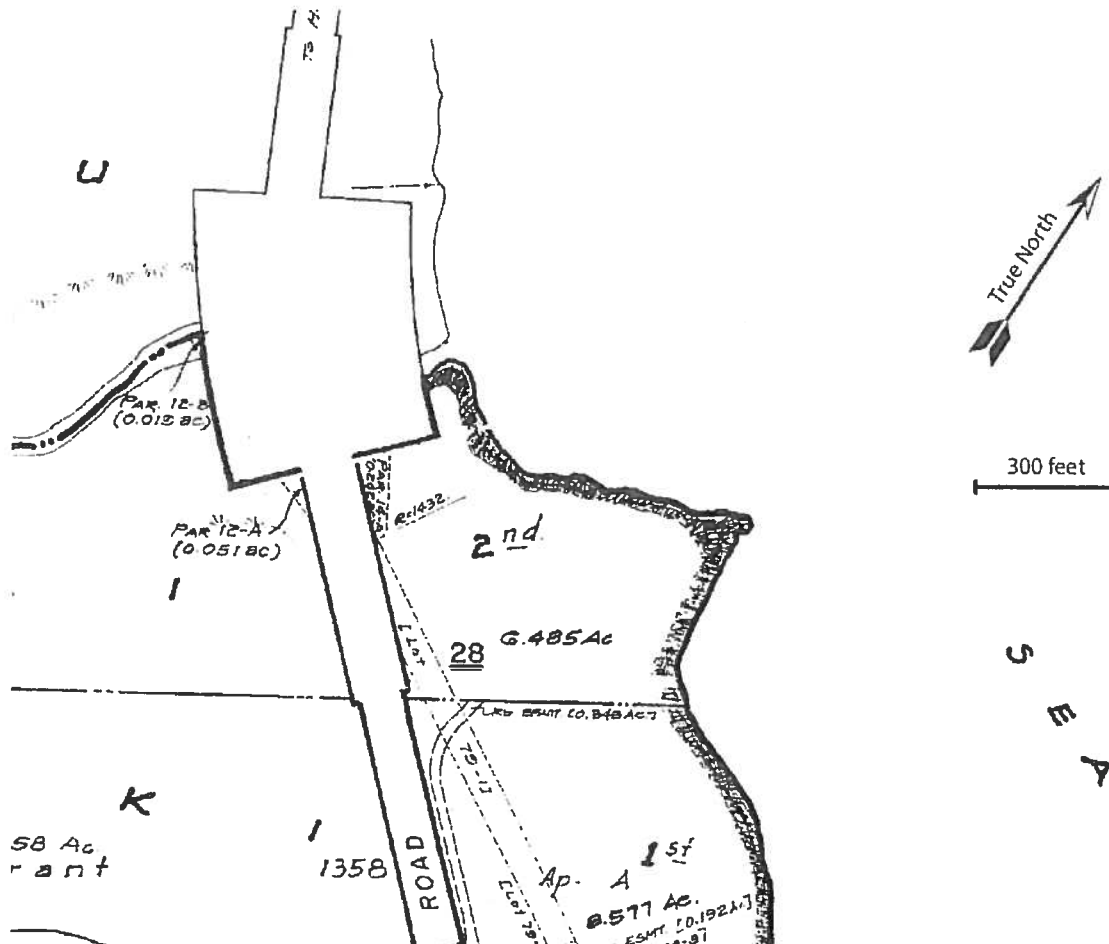


Figure 1 Tax Map Key and Subject Property.

Changes in the coastline over time are the product of the complex and long-term interplay between powerful geological forces, particularly so in Hawai'i. The combined effects of volcanism, erosion, sedimentation, sea-level change, island subsidence, and even bio-genic (ie. reef-building) production over millennia will influence the nature and durability of the coast and the position of the shoreline as we now see it. These processes of both construction and destruction must be accounted for in any evaluation of coastal dynamics (Ramalho, et al., 2013). Volcanic action, mostly new lava flows, build out the island, and then coastlines retreat as mass wasting, marine and fluvial erosion reshape the landscape. The Hawaiian Islands also are subsiding at variable rates across the archipelago; this can accelerate the processes influencing shoreline mobility or future migration.

The dynamics between volcano, ocean and air are difficult to quantify in some aspects, especially on the younger of the Hawaiian Islands which, in their youth, may not yet have reached a long-term, stable equilibrium.

Thorne Abbott (2013) reviews several problematic aspects in determining the AAER for planning purposes in Hawai'i. The difficulties he discusses in measuring erosion rates on lengths of coastline on Maui, apply directly to the Big Island. The problems enumerated include issues with irregular shaped properties and erosion in multiple directions and the problematic nature of erosion-resistant hard coasts as opposed to soft linear beaches. "Soft" shorelines are in a constant state of change affected by seasonal movements of sand (Abbott 2013:17). Hard coasts are more difficult to monitor, usually changing over only much longer periods of time.

Any estimates are best approached with longer term (decadal) studies of a scope that extends beyond the geography of a single parcel. Ideally, regional monitoring studies would include highly accurate means of terrain mapping such as is available today with LiDAR technology (Rosser 2005).

Despite these drawbacks, it is possible to derive an empirically based, and quantitative estimate of erosion rates on site. This report also seeks to delineate any erosion-prone or otherwise hazardous areas along this section of coastline. Per State definitions, the "shoreline" denotes the highest wash of waves and is usually defined by the line of permanent vegetation. However, for properties bounded by sea cliffs (as here), the "certified shoreline" as defined for construction setback purposes is the upper edge of the bounding sea cliff. The "coastline" is a more general term used in this report for the most seaward edge of land at high tide. We continue below with a description of the property and the ocean conditions for this section of the Hāmākua coast.

Property Location and Physical Setting

Honomū, literally translated, “silent bay” (Pukui and Elbert 1986) is located on the northeast facing, windward side of the island in the southern portion of the Hāmākua District.

The Holcomb property consists of a small promontory immediately south of the mouth of the Honomū Stream. It lies about midway between Lehuawehi Point (to the northwest) and Kohola Point (southeast) which define Honomū Bay (see Figures 2 and 7).

The entire coastline, for several miles southeast and northwest, consists of rocky headlands with small embayments at stream mouths. Heavy stream discharge along this windward slope provides ample volcanic detrital material to coast and small temporary pebble and cobble beaches form where wave energy and coastal slope permit. These same sediment laden streams, however, also prevent the formation of nearshore coral reefs.

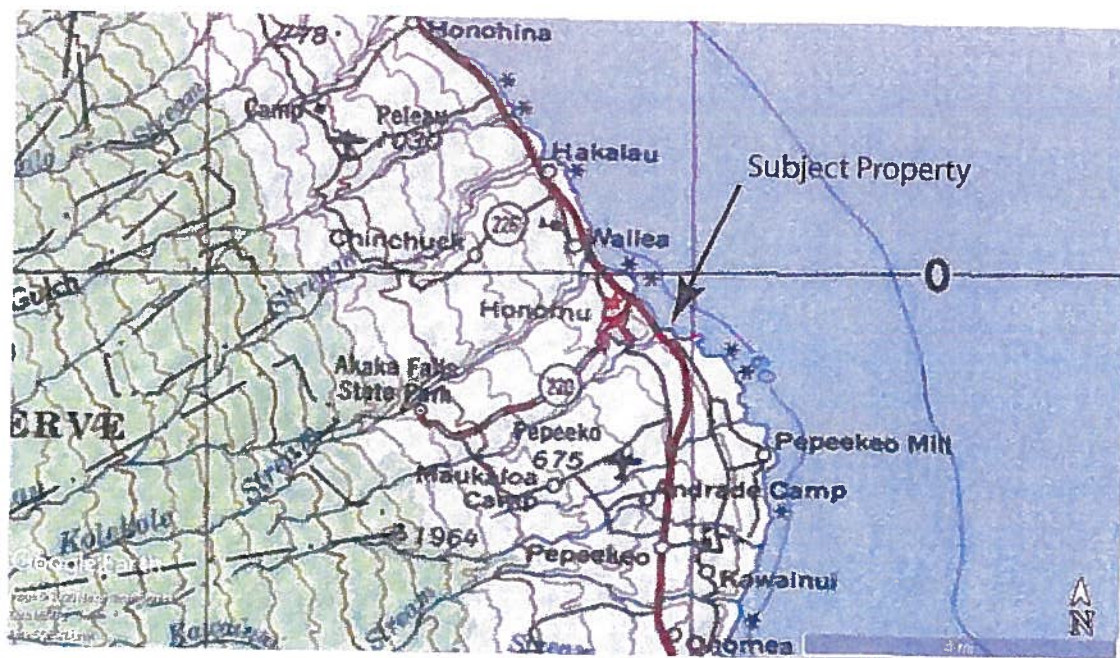


Figure 2 Subject Property, Portion of USGS 1:50,000 scale.



Figure 3 Subject Property, Google image (7.12.2019).



Photo 1 Overview of shoreline, north facing side.



Photo 2 Overview of shoreline, east facing side.

Geological Background

Understanding the sequence of geological events on site provides a fundamental framework on which inferences concerning erosion rates are based. The surficial geology consists of 2-3' of disturbed, mostly brown colored soil that was repeatedly churned by historic sugar operations. This loose material overlies deeply weathered, but stable, yellow-tan ash deposits. The thickness of these so called, "Homelani" ashes (see below), were not directly measureable because of extensive re-working and vegetation cover.

Buchanan-Banks (1983) indicates that where undisturbed, these ash deposits should be about 10 feet thick in this area. They consist of deeply weathered orange to ochre yellow volcanic ash is entirely of air fall origin, and was derived from multiple volcanic eruptions from Mauna Kea volcano. These ashes, which originally consisted of volcanic glass fragments, were carried to the Hilo-Hamaku area from high lava fountains associated with the formation of various prehistoric volcanic cones on Mauna Kea (see Figure 4, "hmc"). These ashes have been dated in part as having mainly been deposited between 10,000 and 40,000 years ago (Buchanan-Banks, 1983). Similar yellow-orange ash deposits form fertile soils once critical to Hawaii's sugar industry all over Hawaii Island, and have together been described as the "Pahala Ash" (Stearns and Macdonald, 1946), although the ashes along the Hāmākua Coast are of very different origin and age than the deposits underlying the cane lands in Ka'u. Buchanan-Banks (1993) later named these Hāmākua ash deposits the "Homelani Ash", as they are the preferred sites for graveyards all over East Hawaii.

Weathering that has taken place over many thousands of years in the moist, warm, tropical climate of this area has converted these ash deposits almost entirely to secondary minerals. Wieczorek and others (1982) studied the mineralogy of the Homelani Ash in the Hilo area, and found the deposits to consist almost entirely of the alumina mineral gibbsite, with lesser amounts of amorphous allophane and very minor quartz (derived from distant sources). Regional relations (Wentworth, 1938) suggest that these ash deposits were originally 12-15' thick in this area, and well indurated, but mechanical cultivation associated with cane harvesting and planting during the last several decades of cane production loosened the upper surface of the ash section and resulted in extensive erosion and soil loss. The thickness of the ash remaining on the land is variable, and was measured at 6-10' where exposed along cliff faces. (Note: the Homelani Ash is not shown on Figure 4).

These ash deposits overly deeply weathered Mauna Kea lava flows of the Hāmākua Volcanic Series (Stearns and Macdonald 1946). There are several poorly-defined subunits within the Hāmākua Volcanic Series lava flows, and the contacts between them are commonly marked by ash and soil deposits (Wolfe and others, 1997). The Hāmākua lava flows vary between 65-200,000 years in age (*ibid.*). These lavas are deeply weathered high on coastal cliffs, but are relatively un-weathered and resistant to wave erosion at cliff bases.

This ash is everywhere underlain by rocks consisting of deeply weathered Mauna Kea lava flows (see Figure 4). These lava flows have few residual volcanic minerals, are almost entirely altered to clays directly below the ash layer. Where undisturbed, they are well-indurated, and can form vertical faces along road cuts, for example. They are also orange to ochre yellow in color, and may easily be mistaken for ash deposits if residual volcanic features are not recognized. These highly altered lavas have been derived from basaltic pāhoehoe flows of the Hāmākua Volcanic Series, which were erupted more than 60,000 years ago from now buried Mauna Kea eruptive

vents (Wolfe and others, 1997). These rocks were collected and described at the flume trench (Locality 4, Figure 8).

Although these lavas are highly weathered in their upper parts, they transition gradationally to relatively fresh, dense pāhoehoe flows at the base of sea cliffs. The pāhoehoe lavas exposed at the shoreline consist of multiple lobes of relatively resistant layered basalt.

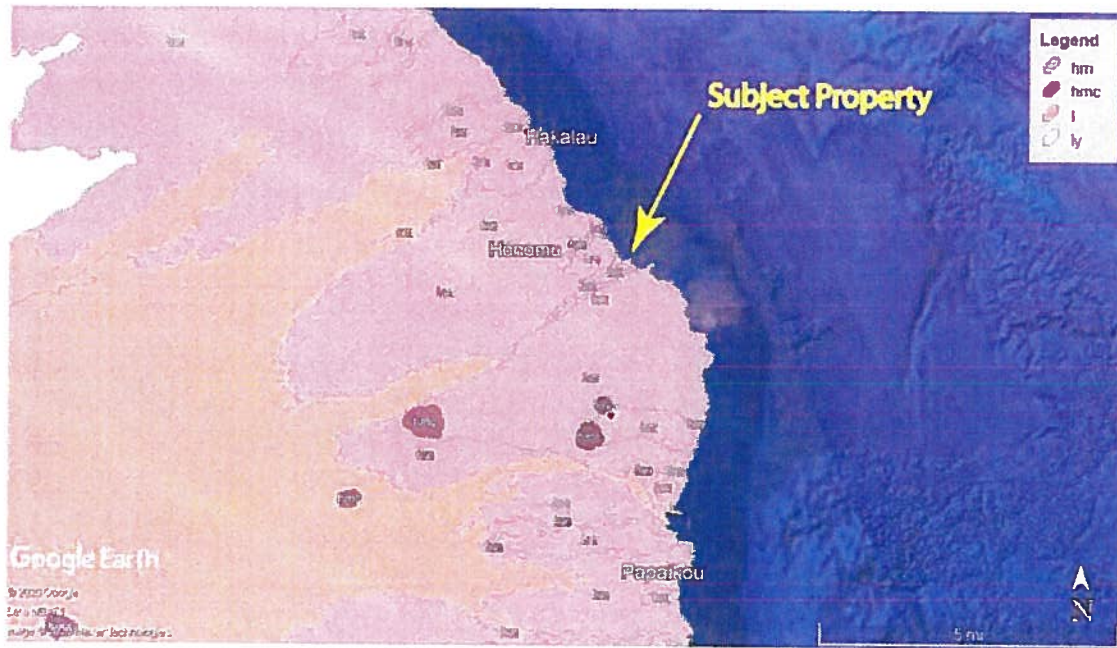


Figure 4 Portion of Geologic Map (Trusdell et al. 2006).

Unit	Description	Epoch	Age B.P.
hm	Hamakua Volcanics, lava flows	Pleistocene	200,000 - 65,000
hmc	Hamakua Volcanics Vent Deposits	Pleistocene	200,000 - 65,000
l	Laupahoehoe Volcanics, lava flows	Pleistocene	65,000 - 14,000
ly	Laupahoehoe Volcanics, lava flows, younger member	Pleistocene/Holocene	14,000 - 4,000

Table 1 Ages of the geological units discussed in the text (Trusdell et al. 2006).

Marine Conditions and Wave Climate

The extremely long fetch of wind crossing the Pacific Ocean creates big, long period swells, generating waves that can rise to significant heights before slamming into the island's flanks. Large waves reaching the coastline at this property are predominantly related to trade wind conditions, though the coastline is also exposed directly to the largest North Pacific swells (Figure 5).

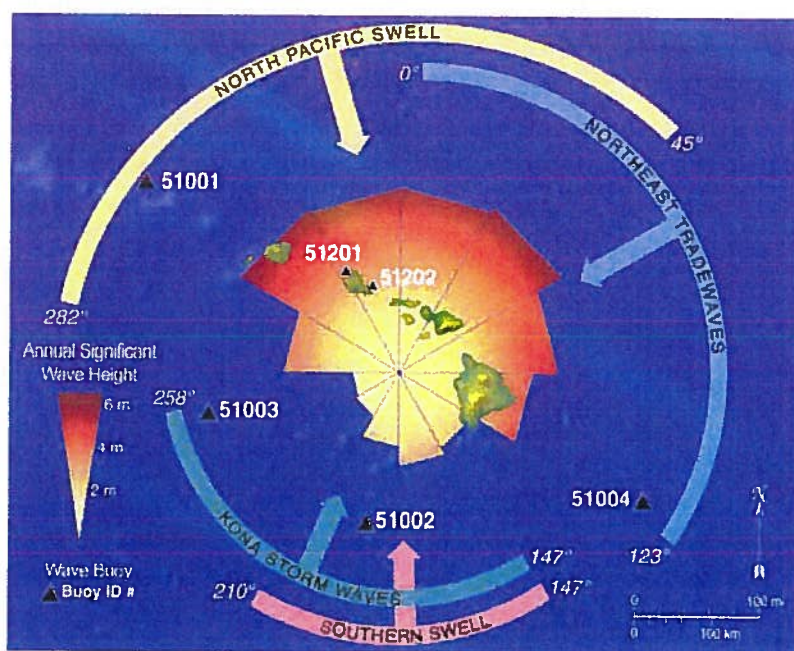


Figure 5 Frequency and magnitude of waves affecting Hawaii (www.soest.hawaii.edu).

The Hawai'i Island coastline faces roughly 45° east of north. However, the Holcomb property's north side faces essentially directly north. On the other hand the southern portion is well shadowed from the direct onslaught of the waves as it faces somewhat south of east.

This is significant relative to typical incoming waves. Note on Figure 5 that the largest waves of all come from the north-north-east, north or north-north-west direction. These North Pacific swells can reach significant heights of 20+ ft. and are a major contributor to coastal erosion and storm damage.

Future changes in storminess and frequency of significantly higher wave heights due to climate change are impossible to quantify. A precise forecast of these positively contributing variables isn't possible, but their potential effects on erosion are considered in our conclusions below.

Rising sea surface temperatures in Hawaiian waters could, for example, influence hurricane storm tracks impacting the islands (Businger, 1998). Any changes in the recurrence interval or intensity of wave energy focused on the coastline are critical factors in the evaluation of erosion along any coast. Merrifield and Maltrud (2011) noted that trade winds have intensified across the Pacific gradually since the early 1990s, e.g., which could also alter the wave climate. Additionally, trends in sea level rise are more pronounced in western Pacific waters, relative to other regions in the World Ocean, with some rates as much as three times

the global average – this will exacerbate the waves effects. The probability and magnitude of sea level rise associated with climate change at the property is discussed in a separate section.

Nevertheless, for tropical waters, the incidence of “one-in-ten year” extreme waves impacting shorelines may double or triple as a consequence of the wind intensification described above (Wang et al. 2014). Substantial wave height increases—by as much as 40%—have also been observed along some Pacific shores, though to what extent this relates to climate change or pulsating phenomena such as the Pacific Decadal Oscillation is unclear (e.g.—Ruggiero and others, 2010). In fact, hypothetically, the incidence of hurricanes in the eastern Pacific may actually *decrease* with warming climate, but the strongest storms will likely become even more intense (e.g.—Grinsted, 2012; Holland and Bruyère, 2013).

Tidal conditions for this part of the island are summarized in Figure 7. These are based upon data collected in nearby Hilo Bay, the closest continuously monitored tidal station to the property. The magnitudes of these relative elevations are an important reference for assessing the importance of any measured changes or, in particular their impacts outside the normal range.

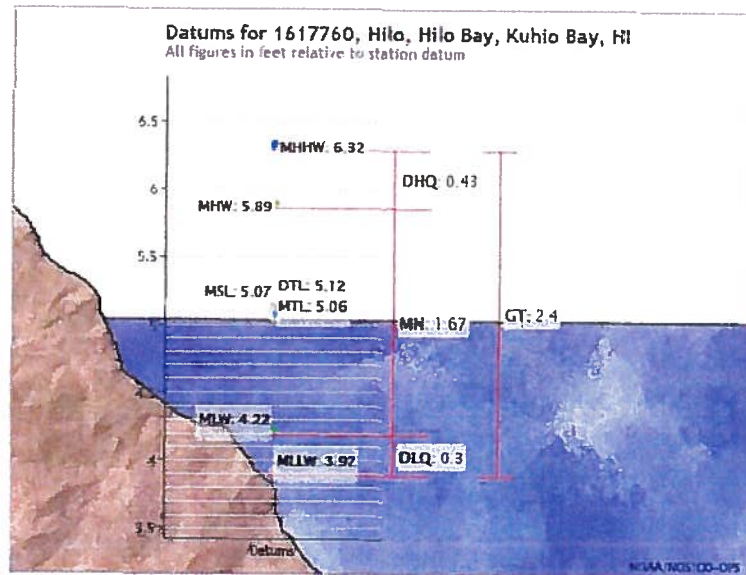


Figure 6 Tidal data for Hilo Bay (in ft.).

The mean range of tidal change (MN) is 1.67 ft. with a Great Diurnal Range (GT) of 2.4 ft. Tidal heights are given as positive and negative values relative to the Mean Lowest Low Water (3.92 ft.) and Mean Highest High Water (6.32 ft.). Understanding the tidal variation throughout the year is important as any instantaneous “snapshot” of the coastline at a given tide can be misleading on the whole. The effects of tides are dependent on beach slope. For example, 2.4 ft. of tide will move the tideline 24 ft. horizontally on a 10% slope. This can have dramatic effects, changing the location and breadth of active weathering.

Field Observations

Although the shoreline is legally defined in Hawaii as “the upper reaches of the wash of the waves, other than storm and seismic waves, at high tide during the season of the year in which the highest wash of the waves occurs, usually evidenced by the edge of vegetation growth, or the upper limit of debris left by the wash of the waves, ...” (HAR §13-5-2).), for properties bounded by sea cliffs – the tops of cliffs are considered the “shoreline” for setback purposes.

Given the complexity of volcanic coastlines and their formation processes, in order to assess the historical and prehistorical movement of the shoreline and identify areas prone to erosion, an attempt was made to inspect the entire length from sea level. This was accomplished through a variety of means including pedestrian, boat and rope assisted access. The evolution of the geomorphology was re-constructed in a simple way. Chronologically constrained “facies” (bodies of rock with specified characteristics) were identified and related in the field. This is a recommended means of assessing complex geomorphic situations in Hawaii and the goal towards which our field methods were oriented. For example, Felton (2002) uses this method to distinguish different forms of emplaced debris, describe the potential mobility of any beach deposits and their nature, and account for isostatic changes in his research on the coastal flanks of Lana'i.

Efforts were made to evaluate the appearance and composition of rock clast sizes, their roundness/sphericity and condition of eroded materials. In addition, the matrix and macro-mineralogical composition of the lava flows present was assessed (see lithology, below). Sedimentary structures and other indications of erosion were mapped and evaluated within the project area (see Structure, below). Particular attention was paid to the nature of the material and slope at several key areas on the property, these profiles and their implications are presented below. Figure 8 is a key to the locations of rocks and situations described further below.

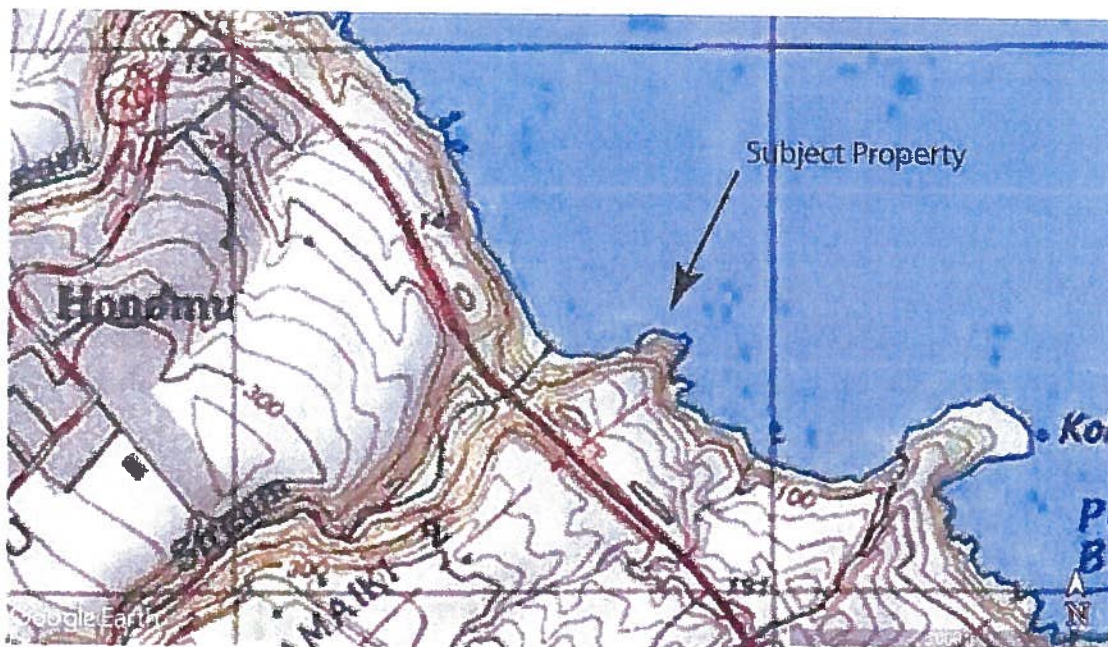


Figure 7 Subject Property, USGS 1:24,000 scale (1984).

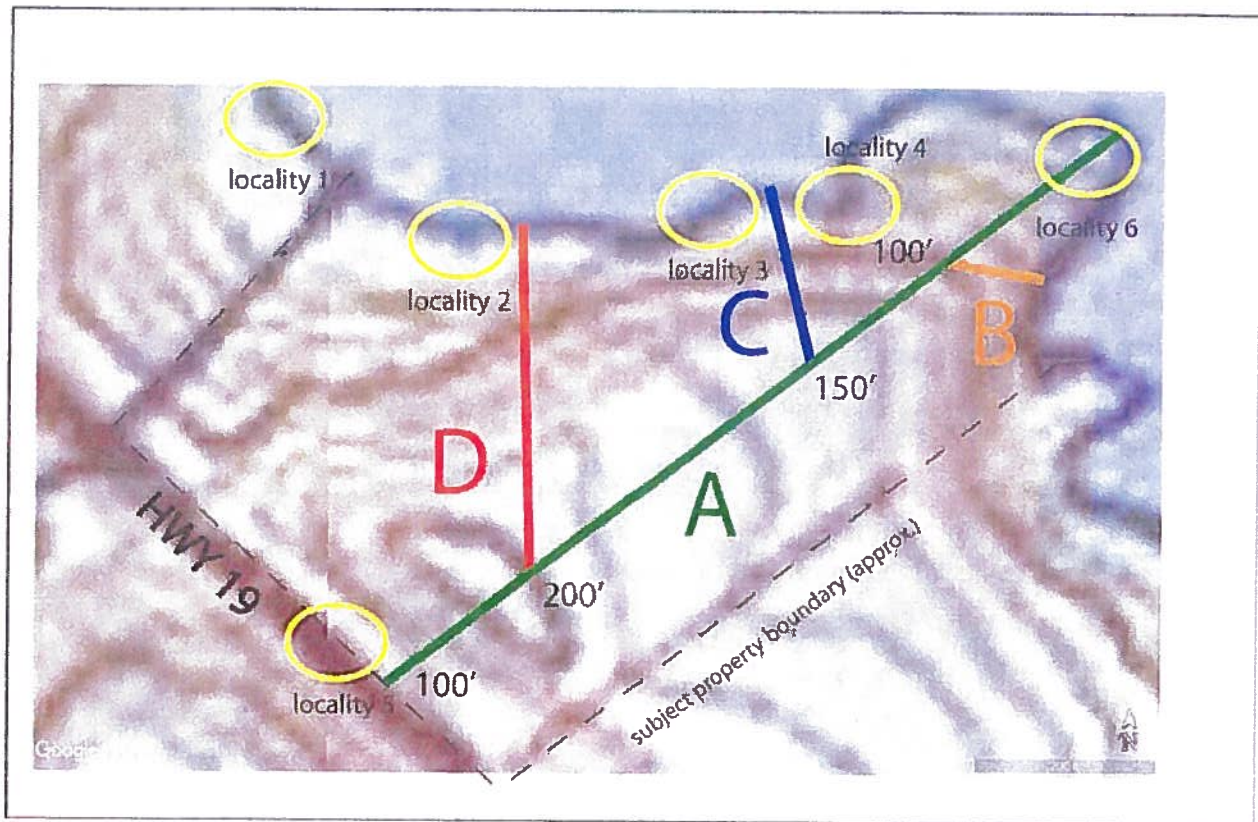


Figure 8 Subject Property Features, Profile Locations and Sample Localities.

Coastal Access

There are two ways in which the point may be accessed. These are by the walking around the coast, and by a ladder on the point itself.

The cobble beach at the mouth of the Honomū stream can be accessed by a narrow jungle track from Māmālahoa Highway. The track is slightly overgrown, but, apparently used somewhat regularly. Saw grass and bananas at the beginning of the track yield to arrowroot and vines lower down. The track is steep, although not exceeding 45° . There are short sections which are 80° to vertical. These steep sections, however, are modified with rough steps, or the descent is assisted by a fixed cable. The path is muddy and in wet conditions extremely slippery.

The point is not accessible from the beach. The waters' edge along the base of the cliff can be traversed only about half-way. The first section is over rough cobble and boulder beach, this gives way to a scoured and narrower shelf of stable bedrock. In 100 meters this bedrock forms a small headland beyond which is only sheer cliff meeting the sea and surf.

A ladder was installed down the nose of the point at some point in the past – probably by fisherman. This ladder is currently accessed by passing through dense saw grass to the edge of the cliff, which is forested with various light underbrush, ironwoods, and weeds. To get to the base, one has to descend around 175 feet. The descent begins with a gentle 45° section for 10 feet, before reaching an aluminum ladder, about 8 feet long. Then there is a steep section with

shallow footholds. This continues for approximately 10 feet. At that point a fiberglass boat ladder is lashed to the slope and the ladder descends another 8 feet or so, however, the top three rungs are broken. At the base of the fiberglass ladder there is a sizable ledge with a large ironwood tree growing (see Photo 3). Further descent is near vertical and was not attempted. There is a long ladder of milled wood, and round head nails, secured with rusted iron spikes. There is evidence of a fire at the top of this ladder. The wooden ladder continues down about 50 feet, where there is another small ledge and a slightly shorter ladder constructed in a similar fashion which ends at the base of the cliff, just above the high surf line.



Photo 3 Abandoned Ladder on Point.

Lithology

All of these Hāmākua Series volcanic rocks are well-indurated. This is apparently due to the extensive mineralization that has accompanied weathering. The rocks are capable of supporting relatively stable near-vertical faces along the old railroad excavations and Highway 11 road cuts at the southwestern margin of the Property.

The massive "basal" lava flow on which the Holcomb property's upper flows rest is the lynch-pin controlling erosion of those overlying rocks. There appears to be some considerable passage of time between emplacement of that basal unit and the overlying, more erosion-susceptible flows - complete with a rarely seen "erosional unconformity".

A red soil and ash layer was noted near the base of coastal sections along the entire perimeter of the Property shoreline (Photo 4). This red-weathered layer, which may define the boundary between "Upper" and "Lower" parts of the Hāmākua Series indicates an erosional unconformity and thus the passage of some considerable time interval (note in Photo 4 the glassy rind on the lower surface of the upper member, as well as the inclusions of clay in that upper rock member's

matrix) . The ash layer is clay-rich, and is believed to play an important role in the erosion of the shoreline, as it separates more resistant, massive rocks below and the intensely weathered rocks above. It may be responsible for relatively recent rock fall collapse events (see discussion below of rock fall collapse mechanisms).

Reference has been made by both Jim Moore and Pete Lipman to the first HSDP borehole data and they have formed conclusions regarding a subsidence rate for Hāmākua. The rate is about 2.5 mm/year so, at 60 k years, you would expect about 150 m of subsidence.

Lava flows can be distinguished by their macro-mineralogy. Representative rock samples were collected from the localities indicated on Figure 8, and examined with low magnification hand-lens. The rocks are deeply weathered, however, and there are few indications of their original flow nature. Vesicle morphology suggests most of them were originally pāhoehoe flows. Because of extensive alteration, little indication of original mineral compositions remain, although sparse remnant phenocrysts (crystals) of dark honey-brown orthopyroxene observed in some samples indicate original compositions included hawaiiite and ankaramite. Potassium – Argon (K-Ar) dating indicates these volcanic rocks include lava flows as young as 81,000 years old at the top of the sequence and basal flows as old as 237,000 years (Wolfe and others, 1997).



Photo 4 Photo of red clay layer separating the “upper” and “lower” Hāmākua series flow.

Structure

These textural comparisons are a key to interpretation of the profile data and facies model presented below. The varied mineralogy, texture and type of rock from each geologic unit respond differently to erosive forces. These different capacities to withstand degradation create instructive morphologies. To assess the extent and impact of these forces on the rock landscape, several scaled stratigraphic profiles were drawn along transects indicated in Figure 8 (profiles A-D). Figure 9, giving an overall gross sense for the topography was drawn from USGS (1994) topographic data and modified with field data. Figure 10 was compiled based solely on measurements and estimates of slope and elevation and other observation taken in the field. The locations of these four profiles are shown on the reference Figure 8, above.

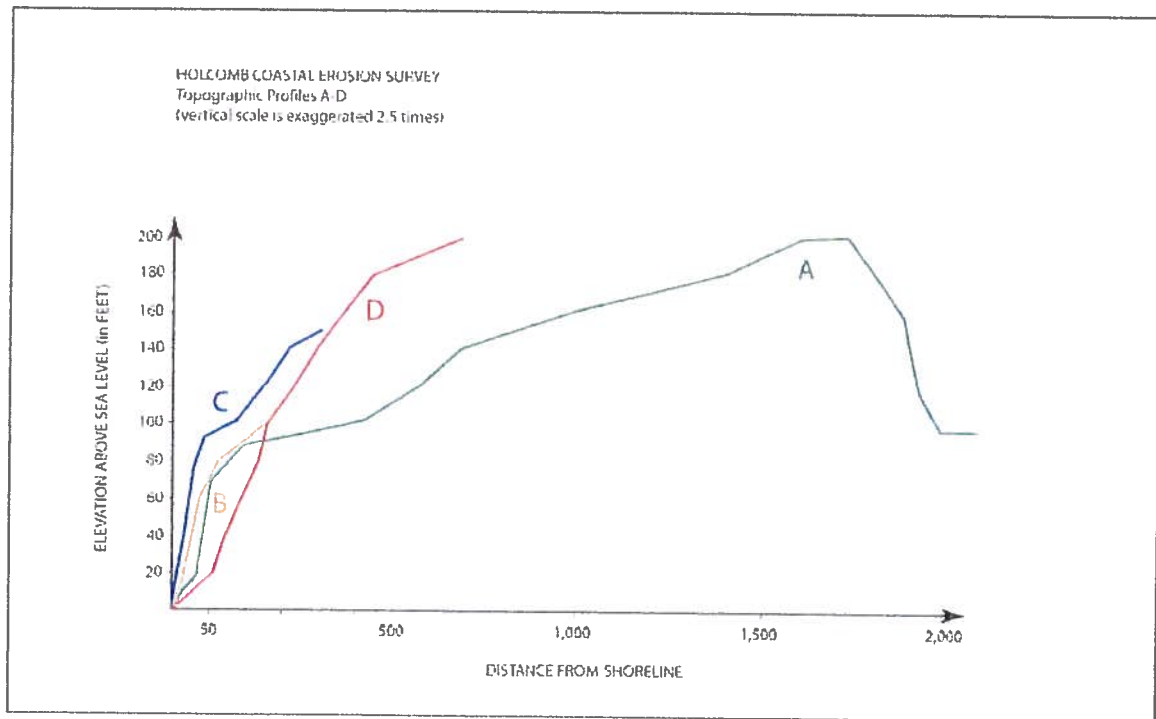


Figure 9 Subject Property Slopes at A-D.

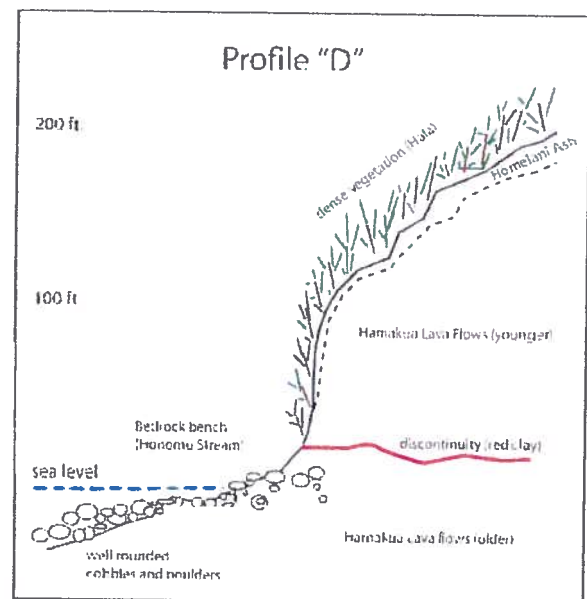
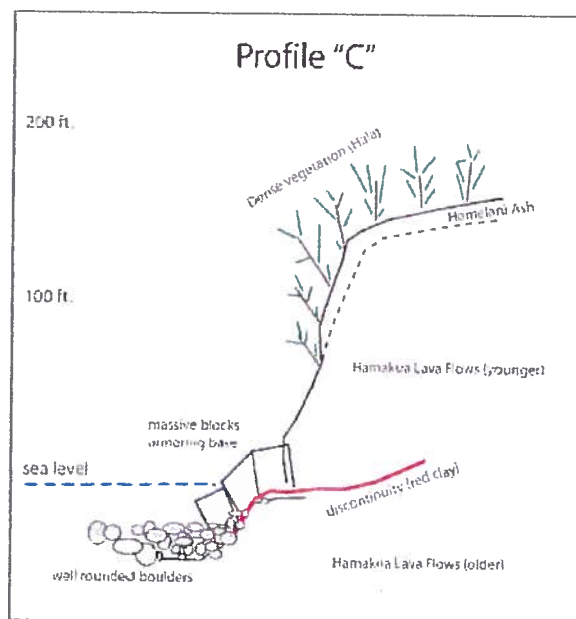
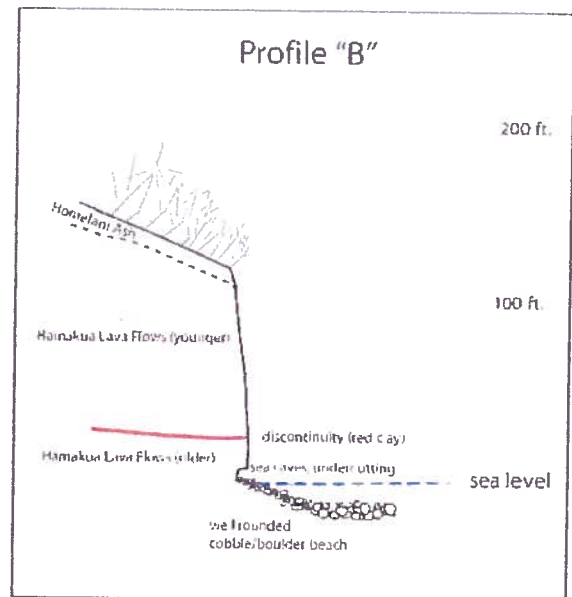
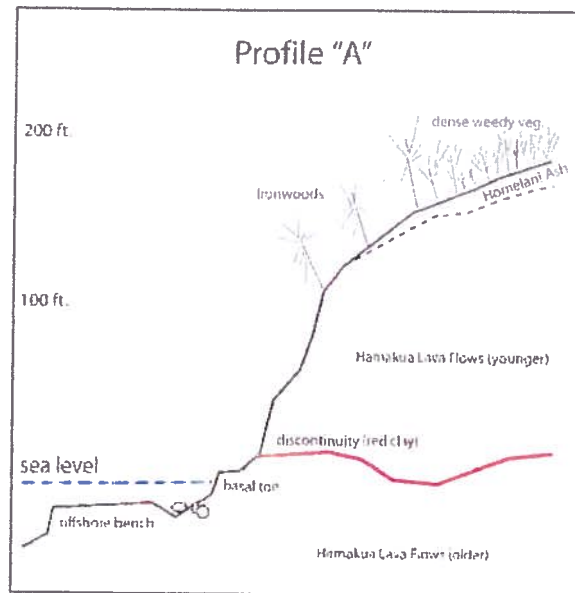


Figure 10 Geologic sections at A – D.

Erosion Processes

Coastlines can be classified, generally, into “soft” and “hard,” depending upon whether they consist of sands and related fine, easily transportable sediments or of solid less easily weathered substrate. Almost all shoreline change studies focus on soft coasts, including quite recently within the Hawaiian Islands (e.g., Anderson *et al.*, 2015). Available data for hard coastlines are otherwise scarce.

Several key processes are at work contributing to erosion of the subject property and all typical hard coasts. Wave energy impacting the bluff loosens masses of rock by compressing air within fractures (“hydraulic ramming”), while the drag of moving water, boulders and cobbles, and abrasively grind smaller fragments into sand at the shore. Wind and gravity can loosen free pieces rock and redeposit them as breccia, though none were found on the property. Storm seas coincident with extreme tides can be especially erosive. There is no way to definitely quantify the relative contributions of these processes, though it is reasonable to say that the energy released by wave action is probably the main cause of shoreline retreat at this locality.

The following photos illustrate several of these processes in operation at the subject property.



Photo 5 Sea Caves



Photo 6 Bedrock riverbed and well-rounded boulders at the entrance of Honomū Stream.

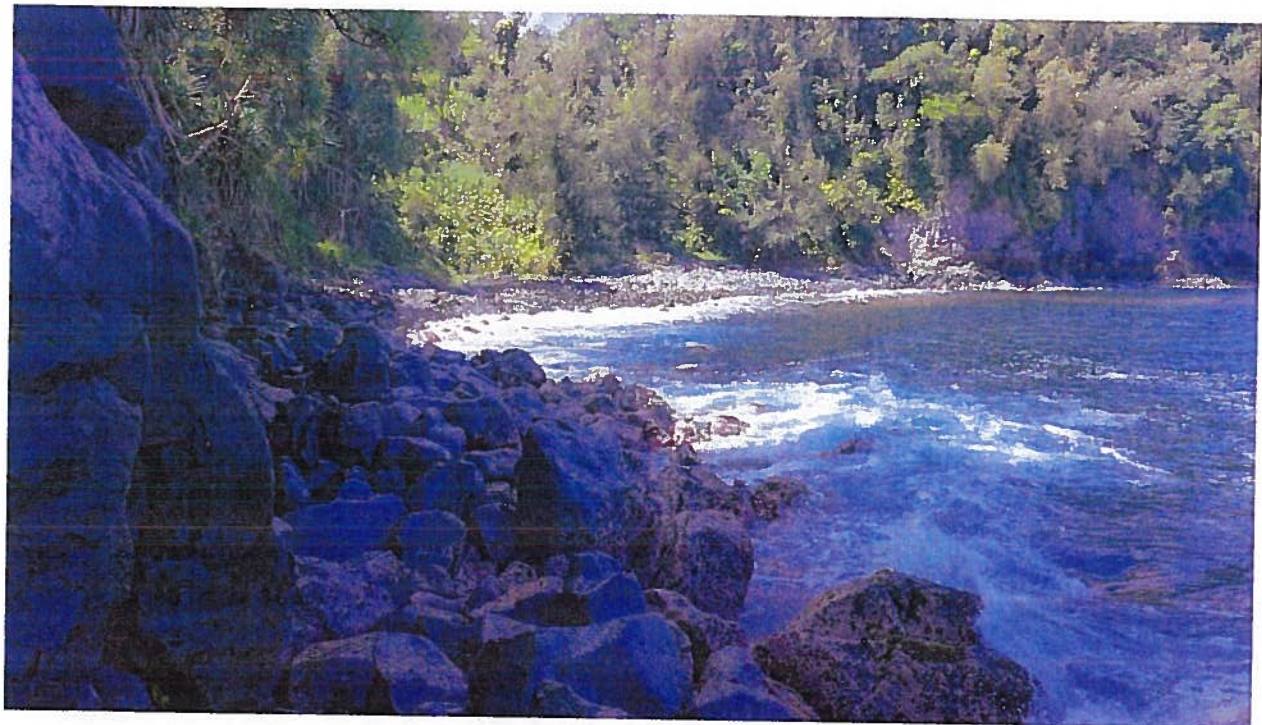


Photo 7 Sub-angular Rocks Armoring Shore at "C".

For example, Photo 5 shows the punctuated slopes on the east side of the property. While these cliffs are lower in height, the upper vegetated portions give way abruptly to nearly vertical cliffs plunging to the sea. 1954 aerial photography shows vegetation rock fall scars (Fig. 11).

Undercutting of the cliff is apparant and a small sea cave is visible at the base on the left side, just beyond the property boundary.

Photo 6 is taken at the mouth of Honomū Stream (Locality 2). Several items are of note in this image. First, note the bedrock over which the stream flows. This is solid bedrock, the same as is inferred to buttress the point. Here it is overlain by a cobble and boulder beach, which it continually supplies with more stones. Note, that the background of the photo a visible shoreline is present in a vegetation line and buildup of colluvial sediments against the base of the cliff. Wave energy impacts this bluff only rarely and retreat is unlikely in the near future.

Photo 7 is taken at Locality 3/Profile "C". The view back towards the beach affords a good look at the armoring at this minor promontory. Note, on the immediate left in the foreground, the dense "bluerock" outcrop, smoothed with ages of wave action, but practically immovable. In the center, fronting this massif we see angular and sub-rounded boulders of this very material, faulted off on large blocks, but still providing a great mass of buffer to the oncoming hydraulic assault.

Soil Loss and Slope Erosion

Little is known about pre-contact Hawaiian agricultural practices in this area, but clearing of native forests must have resulted in increased erosion. The low intensity of vegetable crop production by Hawaiians probably caused only minor additional erosion, but all this changed abruptly with the beginning of industrial-scale sugar production along the Hāmākua Coast in the late 19th century. Traditional cane harvesting by hand methods with no need for reseeding caused relatively modest erosion, but the introduction of machine harvesting after WWII directly led to major soil erosion, as the delicate Homelani Ash was deeply cultivated and churned during harvesting and planting. The offshore waters of the entire Hāmākua Coast were stained brown for miles offshore during times of heavy rainfall, and vast amounts of valuable topsoil were permanently lost through erosion. The closure of sugar operations along the Hāmākua Coast in 1993 began a period of healing to the soils beneath old cane lands, but considerable care is required to protect remaining soil, as the upper 1-2 feet of the Homelani Ash soil is highly susceptible to erosion during periods of heavy rainfall. The remaining Homelani Ash beneath the disturbed zone is very well indurated and resistant to erosion

Rock fall and Cliff Failure

Where covered by extensive vegetation little erosion is caused directly by rainfall, and retreat of the cliff edge is almost entirely caused by rock falls initiated from below. Several rock fall scars were investigated during our field inspection, and it appears these were mostly caused by failure of the deeply weathered lava flows of the Hāmākua Series (see Photo 8). These deeply weathered rocks are characterized by a system of joints (rock fractures) that mostly parallel the cliff face.

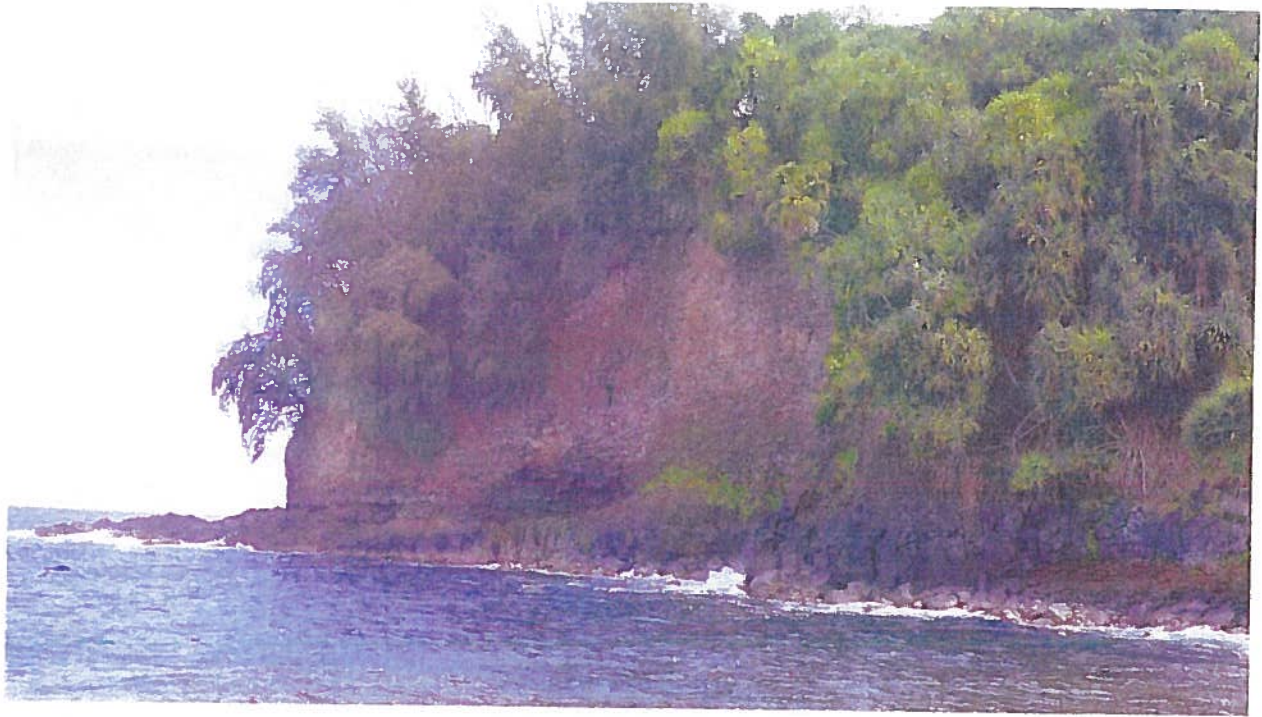


Photo 8 Major rock fall scar.

In most examples studied, the rock falls are derived from the deeply weathered lavas and do not involve the underlying solid lava flows exposed at the shoreline. Once the cliff faces are destabilized by either erosion from below or by the impact of tree roots (next section), the actual rock falls appear to be initiated by two primary factors: times of prolonged heavy rainfall, and regional earthquakes. Rainfall contributes to rock falls in two ways the increased weight of the water saturated rocks and soil on the cliff face, and, more importantly, the increased intergranular pore pressure exerted by rainwater as it infiltrates cracks within rocks. Flights along the Hāmākua coastline following periods of heavy, prolonged rainfall will always reveal fresh scars on the sides of cliffs that have been caused by rainfall-induced rock falls and landslides. The processes involved are the same as those that cause rock falls and landslides along Hāmākua roadways during periods of heavy rainfall.

Ironwood

Ironwood trees (*Cassuarina equisetifolia*) infest the slopes at the tip of the property and along the eastern facing side. The deep roots of ironwoods exploit cracks in the cliff face, and contribute to mechanical instability. Native plants such as naupaka (*Scaevola taccada*) and hala (*Pandanus tectorius*) have shallow roots and can aid in the stabilization of slopes. Hala, are commonly found in moist coastal location and on valley slopes (Wagner 1990).



Photo 9 Transitional slope and Ironwood litter.

Established groves of these native plants can be convincing indicators of relative stability, in fact. The presence of mature hala trees indicate that no rock falls have occurred for a very long time. This is the case for the northwest section of the property's coast, from the flume-cut to the cobble beach. The contrast between property slopes covered in native versus invasive species is particularly vivid in Photo 8 (notice the hala on the right and fresh scars below the ironwoods on the left).

The ironwood trees, also known as Australian Pine, are the most serious cause of accelerated erosion, as their root systems are very aggressive at exploiting cracks and joints in bedrock and forcing these joints open wider – which fragments and loosens otherwise cohesive rocks. In contrast to shallow-rooted native Hawaiian plants that once grew along and stabilized these cliffs, the ironwood trees have extensive roots that penetrate deeply into the cliff faces and directly set the stage for rock fall triggering by heavy rains or earthquakes

Dense concentrations of ironwood trees can crowd out native species, or poison them by chemical contamination (note how few other species there are in Photo 9). Regarding the ecological impact of ironwood along coastlines, Swearingen (1997) states that:

C. equisetifolia is fast-growing (1.5 to 3 meters per year), produces dense shade and a thick blanket of leaves and hard, pointed fruits that completely cover the ground beneath it. Dense thickets displace native dune and beach vegetation, including mangroves and many other resident, beach-adapted species. Once established, it radically alters the light, temperature, and soil chemistry regimes of beach habitats as it outcompetes and displaces native plant species and destroys habitat for native insects and other wildlife. Chemicals in its leaves may inhibit the growth of other plants underneath it.

Granulometry

One of the easiest ways to recognize the relative age of rock falls that have fallen from the cliff face fronting the Property is to note the shapes of boulders present along the shoreline. Since there is little lateral movement of rocks along shore, the areas beneath recent rock falls are marked by angular boulders that have not had time to be rounded by wave action, whereas in areas where there is no evidence of recent rock fall activity, shore boulders are well-rounded (as noted in the above Photos).

These features together serve to qualify the extent, type and likelihood of both stochastic and gradual geologic processes. Next we turn to the attempt to quantify these processes and the speed at which they are at work.

Quantification of Erosion Rate

Historic Aerial Photos and Maps Analyses

Aerial imagery was examined for evidence of major changes in coastal profile or shoreline movement during historic times. The oldest image found included one captured by the Navy in 1954. Hi-resolution (600dpi) stereoscopic pairs of images from 1954, 1965 and 1977 were examined systematically under a Farichild binocular magnifying stereoscope (model F-71).

<u>DATE FLOWN</u>	<u>SOURCE</u>	<u>PROJECT NAME</u>	<u>FLIGHT LINE</u>	<u>PHOTO NO.</u>	<u>MAGIS NO.</u>
<u>1954-14</u> <u>October</u>	<u>USN-USGS</u>	<u>HAI</u>	<u>8</u>	<u>003</u>	<u>016-1437</u>
<u>1954-14</u> <u>October</u>	<u>USN-USGS</u>	<u>HAI</u>	<u>8</u>	<u>004</u>	<u>016--1438</u>
<u>1954-14</u> <u>October</u>	<u>USN-USGS</u>	<u>HAI</u>	<u>8</u>	<u>Unnumbered-oblique</u>	<u>016-1095</u>
<u>1954-14</u> <u>October</u>	<u>USN-USGS</u>	<u>HAI</u>	<u>8</u>	<u>Unnumbered-oblique</u>	<u>016-1096</u>
<u>1965-16</u> <u>January</u>	<u>USDA</u>	<u>EKL</u>	<u>6CC</u>	<u>121</u>	<u>062-5510</u>
<u>1965-16</u> <u>January</u>	<u>USDA</u>	<u>EKL</u>	<u>6CC</u>	<u>122</u>	<u>062-5511</u>
<u>1977-03</u> <u>January</u>	<u>USGS</u>	<u>GS-VEEC</u>	<u>4</u>	<u>134</u>	<u>007-408</u>
<u>1977-03</u> <u>January</u>	<u>USGS</u>	<u>GS-VEEC</u>	<u>4</u>	<u>135</u>	<u>007-409</u>

Table 2 List of historical aerial photograph references.

The scale of the photos and the precision measurements presented some confounding factors. When enlarged to an appropriate scale for our analysis, the photos were “grainy” with pixels equivalent to 10 ft. or more.

In addition to the resolution of the photos, the time of day they were taken causes shading differences can easily obscure important smaller-scale details such as the shifting of a boulder here or modest collapse of a ledge there. Note in Figure 11, a reproduction of a portion of the original photo how poorly the north slope of the property is illuminated.

Unknown differences in tidal level and surf conditions at the times individual photography was obtained, also contribute to the lack of precision. The average diurnal range of tides is 1.67 ft.; on a beach with a slope of 30% (1:3) this translates to a change of approximately 5 ft. of horizontal distance, adding another confounding variable to our photogrammetric methods.



FIELD MAP
OF THE
HONOMU SUGAR COMPANY,
SOUTH-HILO, HAWAII, T.H.

Scale: 1 inch = 100 feet

A. J. W. 1934

Figure 12 Portion of Honomū Sugar Company Field Map (1932).

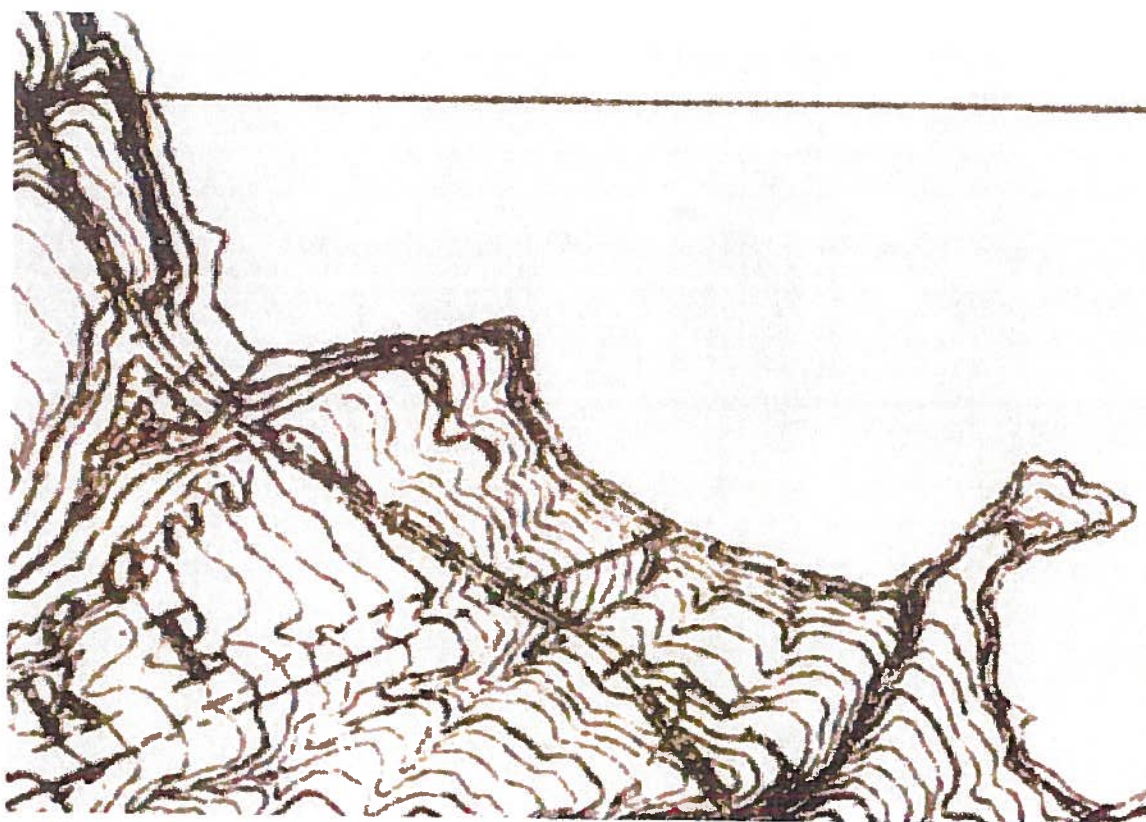


Figure 13 Portion of Onomea Quadrangle, USGS (1930).

Consideration of these maps spanning a period of 90 years yielded no apparent changes in configuration of the headland or of any major changes in coastal morphology. It does seem that the biggest changes occur on the headland seaward of the flume trench. In 1954 the cliff edges are distinct and crisp, seemingly approaching vertical. However, today and throughout the series of photos, it becomes apparent by 1970's that the vegetation is changing and soil loss may be occurring, the slopes become more gradual and rounded. However, this surficial erosion does not seem to have had any effect on the shoreline; in fact, this wasted material may have provided some buffer to any erosion at the base of the cliffs.

Given the lack of measureable changes on the photos the *minimum* Average Annual Erosion Rate for the subject property may be zero. However, photographic resolution precludes the identification of any changes smaller than a single pixel (estimated to resolve to ~10 ft. sq.) Conversely, then a *maximum* AAER of 0.15 ft. per year is possible.

Discussion of AAER

Calculating *the* erosion rate for the property is problematic because the actual rate is constantly changing with conditions. Over geologic time coastlines will go through periods of relative stability followed by rapid change. Sea levels rise will have dramatic consequences for future erosion rates.

Effects of Island Subsidence and Sea Level Rise (SLR) on the Migration of the Shoreline

Predicting Sea Level Rise (SLR) is a notoriously difficult task. Hwang *et al.* (2007) use a figure of 0.16 inches per year in their assessments of present-day SLR for Oahu, but an overall global rise in sea level of 40 inches by the end of the 21st century has been proposed by Fletcher (2010) and others, that translates in to almost one-half inch per year (0.44 in/yr over 90 years). SLR for any particular area depends heavily on local factors (water temperatures, ocean currents, salinity, etc. Anderson and others (2015) predict a doubling of current SLR rates for Hawaii within 30 years because of climatic factors (polar ice melting, increase in ocean temperatures).

Sea level rises' effect on the erosion of sandy beaches, found on older islands with more gradually sloping coastlines, has been predicted to be two orders of magnitude greater than the amount of the rise. This general prediction for soft coasts is borne out by mathematical models of the interaction between sea level and sedimentary equilibria (Bruun 1962). In a confirmation of these theoretical effects based on the evaluation of continental scale historical data sets, Zhang *et al.* (2004) conclude that there is a "multiplicative association" between climate change, resultant sea level rises, and coastal erosion. Their modeling leads them to conclude that the effect of coastal erosion, already severe in the 20th C., will be much worse in the 21st. While their discussion focuses on sandy beaches, the theory holds for hard coasts as well – though the magnitude and response times would differ, in particular given the vertical and durable coasts of the younger Big Island.

A "worst-case" eustatic sea-level rise estimate of 78 inches by the end of this century (.96 in/yr) is given by Pfeffer (2008). Solomon (2007) estimates the rise at 40 inches, a more conservative estimate and in-line with Fletcher's (2010) estimate above. The greatest rate of SLR will take place during the second half of this century according to recent modelling (e.g.--Cazenave and Le Cozannet, 2014).

Total sea level, of course, is a result of the combined changes in elevation of both water and land. Therefore, we must distinguish between eustatic and isostatic change. Eustatic changes are due to a greater or lesser volume of water in the oceans globally which is affected by global warming. Isostatic changes are locally affected by crustal movements and land subsidence or accretion.

The Big Island of Hawaii is sinking into the Earth's mantle because of the gravitational isostatic load of its growing volcanoes. A subsidence rate of (0.08 - 0.12 inches per year) related to isostatic sinking has been determined by submersible studies of drowned reefs off west Hawaii (Moore and Fornari 1984).

The potential changes in eustatic SLR must be added to predicted isostatic changes in crustal

subsidence rates for easternmost Puna. These changes are summarized in Table 2, below.

	<u>MINIMUM</u> <u>(in/yr)</u>	<u>MAXIMUM</u> <u>(in/yr)</u>
<i>Land subsidence - positive isostatic change (Moore and Fornari 1984).</i>	0.08	0.12
<i>Global Sea-level rise - positive eustatic change (Fletcher 2010, Solomon 2007 and Pfeffer 2008).</i>	0.44	0.96
Sea-level rise (sum)	0.52	1.08

Table 3 Summary of Potential Sea Level Rise.

Future combined sea level change and land subsidence is likely to cause an increase in block failures in this area over the long term (100 years-scale). These changes will slowly and episodically increase the erosive action of storm waves at higher and higher elevations over the next several decades.

Anderson and others (2015) studied this phenomenon in the context of low-lying “soft” coasts (beaches) throughout the Hawaiian Islands and concluded that average rates of shoreline recession would double by the year 2050, and increase to 2.5 times present and historically measured values by 2100, with shoreline retreats of as great as 190 ft. possible at some beaches. The relevancy of this study to “hard” substrates across the Big Island is unclear. This is something to consider in planning. Army Corps models of SLR for the islands come to similar conclusions with at least a foot and possibly as many as 5.5 feet of SLR by the end of the 21st Century (see Figure 14).

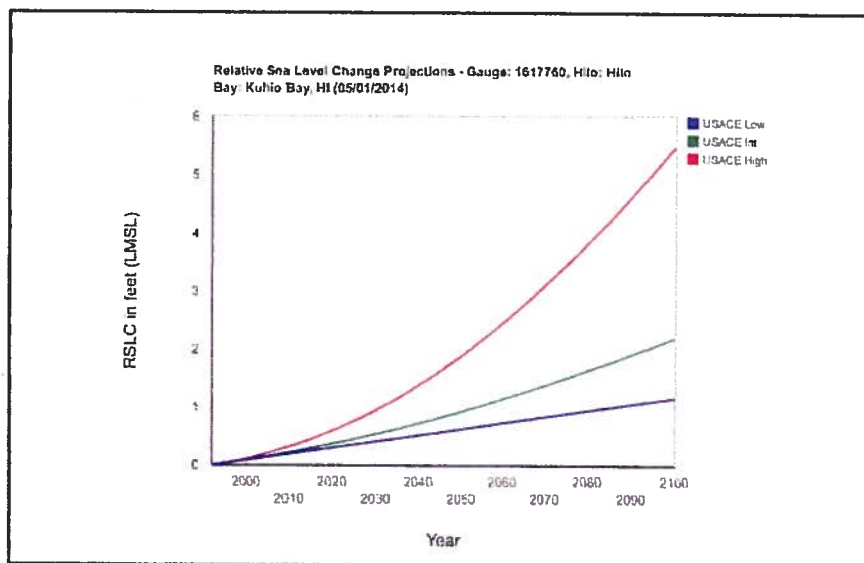


Figure 14 Projected Sea-level Rise for Hilo, HI (www.corpsclimate.us/ccaceslcurves.cfm).

General Coastal Zone Hazards

In a national assessment of coastal vulnerability conducted by Woods Hole for the United States Geological Survey, six variables were examined in the construction of an alternate, "Coastal Physical Vulnerability Index" or, CVI (Thieler Hammer-Klose 2000). These include mean tidal range, coastal slope, rate of relative sea-level rise, shoreline accretion and erosion rates, mean wave height and geomorphology. The geomorphology, calculated erosion rate, mean tidal range and coastal slope variables can be considered in this case as moderate, while two of the factors listed might cause some concern, sea-level rise and significant wave events. More to the point is the importance of a holistic treatment of coastal vulnerability.

Hwang (2005) recommends that all hazards facing coastal areas should be considered when planning for land-use zoning in Hawaii, and not just erosion. Fletcher *et al.* (2002:150) calculated island-wide hazards assessments for Hawaii's coastlines. These hazards are rated on an ascending scale from 1 (low) to 4 (high). The specific hazard risk levels for this area of Hāmākua are shown in the following Table (3):

Hazard Type	Risk Level
Tsunami (1-4)	3
Stream Flooding (1-4)	1
High Waves (1-4)	3
Storms (1-4)	3
Erosion (1-4)	2
Sea Level Change (1-4)	4
Volcanic/Seismic (1-4)	4
Overall Hazard Assessment (1-7)	4

Table 4 Summary of Coastal Hazards at the Holcomb Property.

Sea-Level rise ranks as one of two highest risk categories. Fletcher *et al.* (2002:21) estimate a decadal seal level rise for Hilo of 1.55 +/- .09 inches (almost 4 centimeters per 10 years). Sea Level Rise has been discussed above at length. Correspondingly, the risk level at the property for future higher water is 4.

The risk of any lava flows impacting the property is near none. Mauna Kea is a dormant volcano (Lockwood and Hazlett, 2010). The area lies in the USGS's Zone 8 (out of 9 zones of decreasing risk). This means that not only have there been no historic (since 1800) no lava flows, but none in the past 750 years and furthermore, in the last 10,000 years only a few percent of the area has been covered. Nevertheless, the volcanic nature of the island presents another hazard, that of earthquakes. The entire island of Hawaii is an active seismic area (Wyss and Koyanagi, 1992), and the southern Hāmākua area in particular is subject to future events.

Seismic events are common in Hawaii and can affect large areas. In 1973, Honomū was the epicenter of a large destructive earthquake occurring on April 26 and measuring 6.2 on the

Richter scale. Seven major rockslides blocked Hwy 19 for seven hours (no one counted how many sea-cliff failures occurred) and 355 homes in addition to 75 businesses were severely damaged (usgs.gov, Unger and Ward 1973). The entire island is subject to the effects of large earthquakes. Because of the potential for major earthquakes on the flanks of Mauna Kea, residential construction on the Property should be built to the highest standards as to earthquake resistance as specified by Hawaii County Building Codes.

Hawaii Island is also susceptible to the effects of seismic and volcanic activity generated around the Pacific Rim. There is a real possibility of tsunami (seismically generated "tidal"-waves) threatening this coastline. However the threat is mitigated by the high cliffs. The effects of a tsunami are highly variable, dependent on both local and extra-regional factors, the beach on the north end could be severely affected. Tsunami have impacted this coast in 1946, 1957 and again in 1960. These three events, two generated by Aleutian earthquakes and the third by activity in Chile, generated maximum wave run-up heights of between 25 feet in '46 and 12.25 feet '57 (Fletcher, et al. 2002:131).

High Waves and storms are also relatively hazardous. The property is exposed directly to the predominant trade winds. These winds approach from between 40° and 90° east of north, at 10 – 20 miles per hour, 70% of the time. This consistent wind produces consistent seas. These conditions combine with large winter storms from the north that regularly create waves between 20 and 30 feet in height.

Stream flooding ranks low. Stream flooding is actually rather common along this coastline with significant events occurring with decadal frequency. However the effects of these events are mitigated by the steep coastline; runoff is focused into deep ravines and channeled to the sea. There is some risk of sheet flow occurring between these channels under heavy rain conditions (Fletcher et al., 2002:132). Attention should be paid to vegetation maintenance and any alterations in surface hydrology.

Construction Considerations

The engineering properties of ash deposits in the Hilo area were investigated by field and laboratory testing of samples of volcanic ash in two shallow core holes above Hilo, about 6 miles south-southwest of the Project site (Wieczorek and others, 1982). As is evident from their sample descriptions and geologic logs, these sites adequately describe the ash units that underlie the Subject Properties.

Through in-situ vane shear, and laboratory vane shear, direct shear, and triaxial tests, Wieczorek and others determined that the "Homelani Ash" ash has relatively high strength in undisturbed state, with internal friction angles ranging from 40° - 43°. They observed that highway cuts as steep as 76° are stable, but that the "sensitivity" of the ash is relatively high. That means the Homelani Ash is relatively strong (and resistant to erosion) where undisturbed, but loses strength when reworked. They caution that, "The high friction angle of the ash permits very steep slopes under static conditions, which because of high sensitivity are particularly susceptible to seismically induced land sliding". Water contents determined for the ash samples studied were variable between different layers, ranging from 100 to nearly 400%, which causes reworked and disturbed deposits of the ash to be subject to plastic flow.

Erosion of the fragile ash soils underlying the Property is only a problem when the soils are

disturbed and exposed to rainfall runoff. These soils are for the most part presently covered by dense non-native grasses, which do a good job of soil stabilization. During new construction activities or future agricultural cultivation, however, care must be taken to not create any channel ways at angles to natural slopes that would develop into sites of rapid erosion during heavy rainfall.

Planned construction includes the roof of a single residence and a driveway with a turnaround area. The footprint of the development is relatively small. Considering the size of the lot, excess runoff from these roadways and rooftops should not produce significant problems. Some consideration should be given to channeling any concentrated rain runoff thoughtfully. Broad, low vegetated swales might serve to redirect flow and more importantly, diffuse and reduce its velocity. This is critical to avoiding any runoff to cliff faces, particularly if any intensive agricultural activities are planned. Where feasible, the creation of impermeable surfaces with excessive pavement or concrete should be minimized.

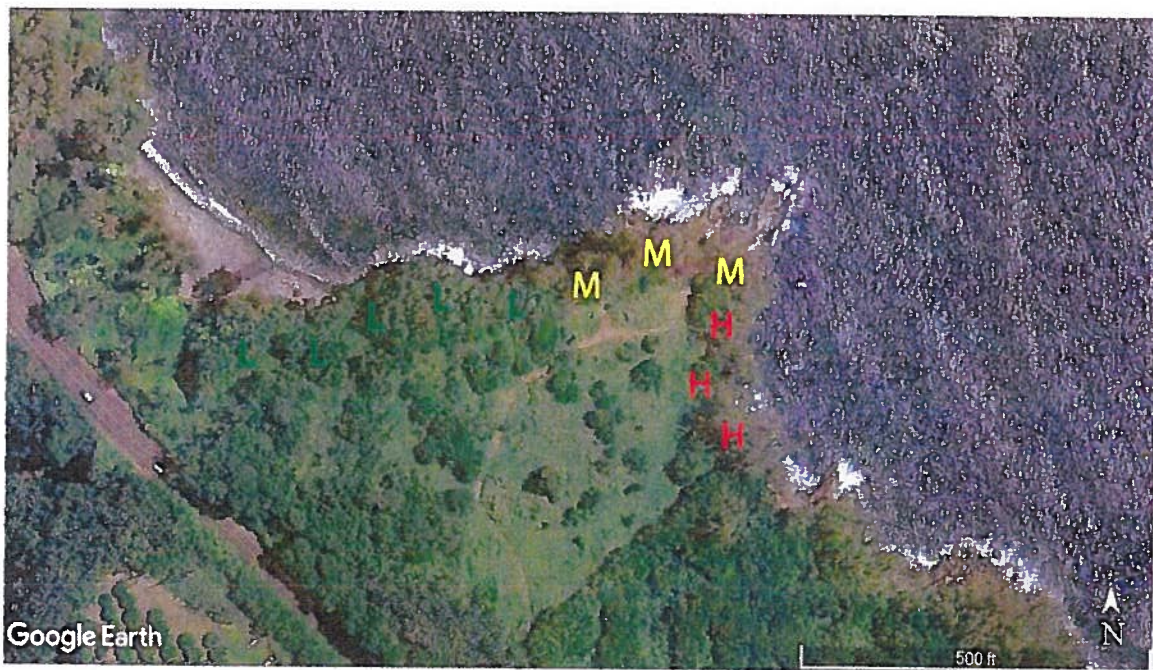
Much of the interior "flat land" of the Property slopes gently seaward. For slab construction, it will be important that any cuts made into upslope faces be protected with concrete "stem walls" or retaining walls that deflect any future flood waters that could flow from upslope during times of heavy rain.

Lastly, the ironwoods present a long term threat to the stability of the coastal edge. Landscaping plans might consider the incremental removal and replacement of the ironwoods with more appropriate species such as naupaka, hala, milo (*Thespesia populnea*) and hau (*Hibiscus tiliaceus*), for example.

Conclusion

As a hard rock coast, it is difficult to assess “erosion rates” in the same terms used for the many beaches and soft sand shorelines of the older islands of Hawaii. Hard coastlines are at one extreme of a “sensitivity scale” in this regard - they are slow responding systems (Hansom 2001). Coastlines such as these are susceptible to High Magnitude – Low Frequency (HMLF) events. For coasts on this end of the sensitivity scale “low frequency” needs to be better defined. Given the probability of significant sea level rise, the frequency can be expected to increase.

The edges of sea cliffs fronting much of the Hāmākua coastline are unstable in many places, have been impacted by numerous rock falls and small landslides over the past several decades. Cliff stability and erosion history of the Hāmākua Coast should be considered by planners as major factors that will impact the longevity and safety of proposed coastal structures. Although the shorelines of Hāmākua are undergoing little change, the edges of the cliffs above have been and are continuing to be modified by erosion – erosion that has been accelerated by poor land-use practices over the past century. Agricultural practices, modified drainage patterns, and the introduction of alien invasive trees along the coastline have all contributed to accelerated erosion of cliff faces along much of the Hāmākua coast, but the impact of these factors can be greatly reduced by wise land-use practices.



H = High Risk

M = Moderate Risk

L = Low Risk

Figure 15 Relative Risk of failure along the subject property sea cliffs.

No measurable erosion of the shoreline fronting the Subject Properties has occurred in the 60 years of available aerial photography. This reflects the stability of the lava flows forming the shoreline and the steepness of the coastal cliffs. The edge of the cliff face has, however, been subject to greatly accelerated retreat

It has proven difficult to calculate a rigorous erosion rate for the property and such rates would vary along its 1,300' shoreline. Photos over the past 70 years and maps from the last 90 indicate the shoreline has been stable ("highest wash of the waves..."). However, this is not the case for the cliffs above, whose edges suffer episodic slope failure. These failures generally, rarely alter the "toe" of the cliff. However, an estimate of the Average Annual Erosion Rate was calculated based on historical and geological sources and treated in as quantitative a manner as the data permitted. Given the dramatic increases in sea level and related impacts of climate change on the forces in question, it would be prudent to treat any rate conservatively. We therefore, recommend weighting this estimate by a factor of at least 20% and conclude that a maximum **final AAER for the property of 0.2 feet per year** is appropriate.

This represents an average annual rate based on estimated changes measured over large spans of time. The actual erosion rate for any given year may vary greatly based on extreme weather or geologic events that could impact the coastline at any given time. The present shoreline is not entirely stable (see Figure 15 above).

We suggest that 100' be considered a minimum setback – in view of the fact that large rock falls have apparently occurred to the northeastern and eastern cliff faces bounding the Property.

References Cited

- Abbott, Thorne. "Shifting shorelines and political winds—The complexities of implementing the simple idea of shoreline setbacks for oceanfront developments in Maui, Hawaii." *Ocean & coastal management* 73 (2013): 13-21.
- Anderson, T.R., C.H. Fletcher, M.M Barbee, L.N. Frazer, and B.M. Romine. 2015, Doubling of coastal erosion under rising sea level by mid-century in Hawaii'i *Natural Hazards v. 78* (1):75
- Bruun, Per. 1962, "Sea Level Rise as a Cause of Shore Erosion." *Journal of the Waterways and Harbors Division*; 88.1, pp. 117 – 132.
- Buchanan-Banks, J. M., 1983, Map showing thicknesses of volcanic ash deposits, greater Hilo area, Hawaii: U. S. Geological Survey Miscellaneous Field Studies, Map MF-1499, 1:24,000.
- Buchanan-Banks, J. M., 1987, Holocene Structural damage and ground failures from the November 16, 1983 Kahoiki earthquake, Island of Hawaii: pp. 1187-1220 in Decker, R. W., Wright, T. L., and Stauffer, P. H. [Eds.], 1987, *Volcanism in Hawaii*: U. S. Geological Survey Professional Paper 1350.
- Businger, S., 1998, poster, Hurricanes in Hawaii; Hurricane and Extreme Weather Phenomena Symposium; Center for the Study of Active Volcanoes, Federal Emergency Management Agency, and National Oceanographic and Atmospheric Administration, <http://www.soest.hawaii.edu/MET/Faculty/businger/poster/hurricane>
- Cazenave, A., Le Cozannet, G., 2014, Sea level rise and its coastal impacts, *Open-Access American Geophysical Union Journal of Earth's Future*, DOI: 10.1002/2013EF000188
- Clague, D. A., Hagerstrum, J.T., Champion, D. E., and Beeson, M. H. 1999, Kilauea summit overflows – their ages and distribution in the Puna District, Hawaii: *Bull. Of Volcanology*, v.61, n. 2, pp 363-381.
- DLNR, 2000, Hawaii Coastal Erosion Management Plan (COEMAP): Hawaii Department of Land and Natural Resources – Land Division, Coastal Lands Program, Special Publ., 90 pp.
- Felton, E. Anne. "Sedimentology of rocky shorelines: 1. A review of the problem, with analytical methods, and insights gained from the Hulopoe Gravel and the modern rocky shoreline of Lanai, Hawaii." *Sedimentary Geology* 152.3-4 (2002): 221-245.
- Fletcher, C. H. , Grossman, E. E, Richmond, B. M. and Gibbs, A. E., 2002, *Atlas of Natural Hazards in the Hawaiian Coastal Zone*: U.S. Geological Survey, *Geologic Investigations Series Map I-2761*, scale 1:50,000.
- Fletcher, C. H., Boyd, R., Neal, W. J., and Tice, V., 2010, *Living on the Shores of Hawaii – Natural Hazards, the Environment, and our Communities*: University of Hawaii Press, 371 pp.
- Grinsted, A., Moore, J.C., Jevrejeva, S., 2012, Projected Atlantic hurricane storm threat from rising temperatures, *Proceedings of the National Academy of Sciences*, vol. 110, no. 4, pp. 5369-5373
- Hall, Adrian M., James D. Hansom, and Jack Jarvis. "Patterns and rates of erosion produced by high energy wave processes on hard rock headlands: The Grind of the Navir, Shetland, Scotland." *Marine Geology* 248.1-2 (2008): 28-46.

- Hansom, J. D. "Coastal sensitivity to environmental change: a view from the beach." *Catena* 42.2-4 (2001): 291-305. Hard coast response to environmental change - not nil...
- Holcomb, R.T., 1987, Eruptive history and long-term behavior of Kilauea Volcano, *in* Decker, R.W., Wright, T.L., and Stauffer, P.H., *Volcanism in Hawaii*, U.S. Geological Survey Professional Paper 1350, USGPO, Washington D.C., volume 1, pp. 261-350
- Holland, G., and Bruyère, C.L., 2013, Recent intense hurricane response to global climate change, *Journal of Climate Dynamics* (on line): DOI: 10.1007/s00382-013-1713-0
- Hwang, D. J., 2005, *Hawaii Coastal Zone Mitigation Handbook: Hawaii Coastal Zone Management Program*, DBED, State of Hawaii, 216 pp.
- Hwang, D.J., and Brooks, B., 2007, Coastal subsidence in Kapoho, Puna, Island and State of Hawaii, Department of Land and Natural Resources, State of Hawaii, 44 p.
- Jurado-Chichay, Zinzuni, Scott K. Rowland, and George PL Walker. "The formation of circular littoral cones from tube-fed pāhoehoe: Mauna Loa, Hawai'i." *Bulletin of Volcanology* 57.7 (1996): 471-482.
- Lim, Michael, et al. "Erosional processes in the hard rock coastal cliffs at Staithes, North Yorkshire." *Geomorphology* 114.1-2 (2010): 12-21.
- Lipman, P.W., Lockwood, J.P., Okamura, R.T., Swanson, D.A., and Yamashita, K.M., 1985, Ground deformation associated with the 1975 Magnitude 7.2 earthquake and resulting changes in activity of Kilauea Volcano, Hawaii: U.S. Geological Survey Professional Paper 1276, 45 p.
- Lockwood, J.P. and Hazlett, R.W., 2010, *VOLCANOES-Global Perspectives*: Wiley-Blackwell Publishers, Oxford, 541 pp.
- Medley, E. W., 2006, Geological engineering reconnaissance of damage resulting from the October 15, 2006 earthquakes, Island of Hawaii, Hawaii, USA: Geo-Engineering Earthquake Reconnaissance Association Spec. Publ., University of California at Berkeley, 39 pp.
- Merrifield, M.A., and Maltrud, M., 2011, Regional sea level trends due to a Pacific trade wind intensification, *Geophysical Research Letters* (on-line), DOI: 1029/2011GLO49576
- Moore, J. G. and Fornari, D. J., 1984, Drowned reefs as indicators of the rate of subsidence of the Island of Hawaii: *Journal of Geology*, v. 92, p. 752-759.
- Moore, J. G., 1970, Relationship between subsidence and volcanic load, Hawaii: *Bulletin of Volcanology*, V. 34, pp. 562-576.
- Moore, James G., and Wayne U. Ault. 1965 "Historic Littoral Cones in Hawaii." *Pacific Science* Vol. XIX
- Moore, R. B. and Trusdell, F. A., 1991, Geologic Map of the Lower East Rift Zone of Kilauea Volcano, Hawaii: U. S. Geological Survey Misc. Investigations Series, Map I-2225, Scale:1:24,000.
- Nielson, N. N., Furumoto, A. S., Lum, Walter, and Morrill, B. J., 1977, The Honomu, Hawaii, earthquake – Report of Inspection: National Academy of Science informal publication, 79 pp.
- Owen, S., Bürgmann, R., 2006, An increment of volcano collapse: Kinematics of the 1975 Kalapana, Hawaii earthquake, *Journal of Volcanology and Geothermal Research*, vol. 150, pp. 163-185

Pfeffer, W. T., Harper, J.T., O'Neel, S., 2008, Kinematic constraints on glacier contributions to 21st-century sea level rise, *Science*, 321 (5894), pp. 1340-1343

Pukui, M. K., & Elbert, S. H. (1986). *Hawaiian Dictionary: Hawaiian-English, English-Hawaiian*. University of Hawaii Press.

Ramalho, Ricardo S., et al. "Coastal evolution on volcanic oceanic islands: A complex interplay between volcanism, erosion, sedimentation, sea-level change and biogenic production." *Earth-Science Reviews* 127 (2013): 140-170.

Rosser, N. J., et al. "Terrestrial laser scanning for monitoring the process of hard rock coastal cliff erosion." *Quarterly Journal of Engineering Geology and Hydrogeology* 38.4 (2005): 363-375.

Ruggiero, P., Komar, P.D., Allan, J.C., 2010, Increasing wave heights and extreme wave projections; the wave climate of the Pacific Northwest, *Journal of Coastal Engineering*, vol. 57, pp. 539-552

Solomon, S. S., 2007, *The Physical Basis: Contribution of Working Group 1 to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, 1009 p.

Stearns, H. T. and Macdonald, G. A., 1946, *Geology and ground-water resources of the Island of Hawaii*: Hawaii Division of Hydrography, Bull. 9, Honolulu, Hawaii, 363 pp.

Swanson, D. A., Rose, T. R., Fiske, R. S., and McGeehin, J. P., 2012, Keanakāko'i Tephra produced by 300 years of explosive eruptions following collapse of Kīlauea's caldera in about 1500 CE: *Journal Of Volcanology and Geothermal Research*, v. 215-216, No. 2, pp. 8-25.

Swearingen, J. M., 1997, *Australian Pine*: National Park Service Plant Conservation Alliance, Alien Plant Working Group, Special Publication, 2 pp.

Thieler, E. R. and E. S. Hammer-Klose, 2000, *National Assessment of Coastal Vulnerability to Sea-Level Rise: Preliminary Results for the US Pacific Coast*. Woods Hole, MA: United States Geological Survey (USGS), Open File Report 00-178

Trusdell, Frank, Edward W. Wolfe, and Jean Morris (2006) <https://pubs.usgs.gov/ds/2005/144/> Digital Database of the Geologic Map of the Island of Hawai'i; U.S. Geological Survey, Data Series 144, version 1.0.

Unger, J. D. and Ward, P. L. 1973, A large, deep Hawaiian earthquake—The Honomu, Hawaii event of April 26, 1973: *Bulletin of the Seismological Society of America*, v.69, pp.1771–1781.

Vitousek, S., Fletcher, C.H., 2008, Maximum annually recurring wave heights in Hawaii, *Pacific Science*, vol. 64, no. 4, pp. 541-553.

Wagner, Warren L., Darrel R. Herbst, and S. H. Sohmer. 1990. *Manual of the flowering plants of Hawai'i*. 2 vols., Bishop Museum Special Publication 83. Honolulu: University of Hawaii Press and Bishop Museum Press. p. 1479-1481.

Wang, X.L., Feng, Y., and Swail, V.R., 2014, Changes in global ocean wave heights as projected usingf CMIP5 simulations, *Geophysical Research Letters* (on line), DOI:1002/2013GLO58650.

Wentworth, C. K., 1938, Ash formations of the Island of Hawaii: Third Special Report of the Hawaiian Volcano Observatory (Hawaiian Volcano Research Association, Honolulu, Hawaii, 183 pp.

Wieczorek, G. F., Jibson, R. W., Wilson, R. C., and Buchanan-Banks, J. M., 1982, Geotechnical properties of ash deposits near Hilo, Hawaii: U. S. Geological Survey Open-File Report 82-279, 20 pp.

Wolfe, E. W. Wise, W.S., and Dalrymple, G.B., 1997, The geology and petrology of Mauna Kea volcano, Hawaii – a study of post shield volcanism: US Geological Survey Professional Paper 1557, 129 pp.

Wright, T L., Chun, J.Y.F., Esposito, Joan, Heliker, C., Hodge, J., Lockwood, J. P., and Vogt, S. M., 1992, Map showing Lava-flow Hazard Zones, Island of Hawaii: U.S. Geological Survey, Misc. Field Studies Map MF-2193, 1:250,000.

Wyss, M., and Koyanagi, R. Y., 1992, Isoleismal maps, macroseismic epicenters, and estimated magnitudes of historical earthquakes in the Hawaiian Islands: U. S. Geological Survey Bulletin 2006, 93 p

Zhang, Keqi, Bruce C. Douglas, and Stephen P. Leatherman. "Global warming and coastal erosion." *Climatic change* 64.1-2 (2004): 41.



Flood Hazard Assessment Report

www.hawaiiinfip.org

Holcomb

Property Information

COUNTY: HAWAII
 TMK NO: (3) 2-8-012:028
 WATERSHED: HONOMU; LAIMI
 PARCEL ADDRESS: ADDRESS NOT DETERMINED
 PEPEKEO, HI 96783

Notes:

Flood Hazard Information

FIRM INDEX DATE: SEPTEMBER 29, 2017
 LETTER OF MAP CHANGE(S): NONE
 FEMA FIRM PANEL: 1551660700F
 PANEL EFFECTIVE DATE: SEPTEMBER 29, 2017

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: NO
 FOR MORE INFO, VISIT: <http://www.scd.hawaii.gov/>

THIS PROPERTY IS WITHIN A DAM EVACUTION ZONE: NO
 FOR MORE INFO, VISIT: <http://dlnr.hawaii.gov/dam/>



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If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND (Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.
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Archaeological Inventory Survey of the 6.5-Acre Holcomb Family Trust Parcel

TMK: (3) 2-8-012:028

Mālamalamaiki 1st and 2nd Ahupua'a
South Hilo District
Island of Hawai'i

DRAFT VERSION



Prepared By:
Genevieve Glennon, B.A.,
and
Lokelani Brandt, M.A.

Prepared For:
Holcomb Family Trust
20411 S.W. Cypress Street
Newport Beach, CA 92660

September 2020



Archaeology • History • Anthropology • Architectural History

Hilo Office: (808) 969-6066 Fax: (808) 443-0065
507-A E. Lanikaula Street, Hilo, HI 96720

Honolulu Office: (808) 439-8089 Fax: (808) 439-8087
820 Mililani Street, Suite 700, Honolulu, HI 96813

ASM Project Number 35400.00



An Archaeological Inventory Survey of the 6.5-Acre Holcomb Family Trust Parcel

TMK: (3) 2-8-012:028

Mālamalamaiki 1st and 2nd Ahupua‘a
South Hilo District
Island of Hawai‘i



EXECUTIVE SUMMARY

At the request of the Holcomb Family Trust (landowner), ASM Affiliates (ASM) conducted an Archaeological Inventory Survey (AIS) of Tax Map Key (TMK): (3) 2-8-012:028, located in Mālamalamaiki 1st and 2nd Ahupuaʻa, South Hilo District, Island of Hawaiʻi (Figures 1, 2, and 3). The current AIS is being conducted in support of an Environmental Assessment (EA) triggered by a Conservation Use Application (CDUA) for the development of a single-family dwelling (Figure 4), and in anticipation of a County of Hawaiʻi grubbing permit application for the project area.

The current study was undertaken in accordance with Hawaiʻi Administrative Rules 13§13-284 and was conducted in compliance with the *Rules Governing Minimal Standards for Archaeological Inventory Surveys and Reports* as contained in Hawaiʻi Administrative Rules 13§13-276. Compliance with the above standards is sufficient for meeting the initial historic preservation review process requirements of both the Department of Land and Natural Resources and the County of Hawaiʻi Planning Department.

Fieldwork for the current study was conducted on August 13th and 18th, 2020, by Genevieve Glennon, B.A., Johnny Dudoit, B.A., Gabriela Edwards, B.A., and Tim Scheffler, Ph.D., under the supervision of Matthew R. Clark, M.A. (Principal Investigator). A total of 28 labor hours were expended to complete the inventory survey fieldwork. Fieldwork consisted of an intensive (100% coverage) pedestrian transect survey of the entire project area with crew members spaced at 10-meter intervals in moderately thick vegetation. The easement that provides access to the project area from the neighboring parcel to the south, Mālamalamaiki Gulch, and the rocky coastal cliffs were also thoroughly investigated. Because the project area was known to have been intensively plowed for sugarcane cultivation from the 1870s to the 1990s, no prospective subsurface testing was conducted. None of the identified features required subsurface testing to resolve questions of age or function. No cultural material was collected during the inventory survey.

As a result of the fieldwork for the current study, a portion of one previously recorded site (Site 50-10-26-24212) and one newly recorded site (Site 50-10-26-31238) were identified and documented. Site 24212 is a portion of the Hilo Railroad-Hawaiʻi Consolidated Railway bed, a portion of which extends near the western boundary of the parcel. Site 31238 is a section of a cut earthen ditch situated along the southeastern edge of Mālamalamaiki Gulch near the northern boundary of the project area. This ditch is the former location of a permanent flume built by the Honomū Sugar Company. Site 24212 is considered historically significant under Criterion a for its association with the development of commercial agriculture (sugarcane) in Hawaiʻi during the early twentieth century and under Criterion d for the information it has yielded regarding early twentieth century sugarcane transportation infrastructure. Similarly, Site 31238 is considered significant under Criterion a for its association with the development of commercial agriculture (sugarcane) in Hawaiʻi during the early twentieth century and under Criterion d for the information yielded relative to the history of the development of commercial agriculture in South Hilo District. No additional historic preservation work is recommended for either Site 24212 or Site 31238 within the project area. Thus, our recommended determination of effect for the project is “no historic properties affected.”

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1. INTRODUCTION

At the request of the Holcomb Family Trust, ASM Affiliates (ASM) has prepared this Archaeological Inventory Survey (AIS) for the development of a proposed single-family residence on a roughly 6.5-acre parcel and access easement within Mālamalamaiki 1st and 2nd Ahupua'a, South Hilo District, Island of Hawai'i (see Figures 1, 2, and 3). A Conservation District Use Application (CDUA) is being prepared for the proposed development in accordance with Hawai'i Revised Statutes (HRS) Chapter 343, and this AIS document is intended to inform that application process and has been undertaken in accordance with Hawai'i Administrative Rules (HAR) 13§13–284, and complies with the *Rules Governing Minimal Standards for Archaeological Inventory Surveys and Reports* as contained in HAR 13§13–276. Compliance with the above standards is sufficient for meeting the historic preservation review process requirements of both the Department of Land and Natural Resources–State Historic Preservation Division (DLNR–SHPD) and the County of Hawai'i Planning Department. This report contains background information describing the location and environment of the project area; a culture-historical context for the project area; a summary of the previous archaeological work conducted in the vicinity of the subject parcel; an explanation of the study methods; detailed descriptions of all of the archaeological sites and features encountered; interpretation and evaluation of those resources; treatment recommendations for all of the documented sites; and an HRS Chapter 6E statement of effect with regard to the proposed development of the parcel.

1. Introduction

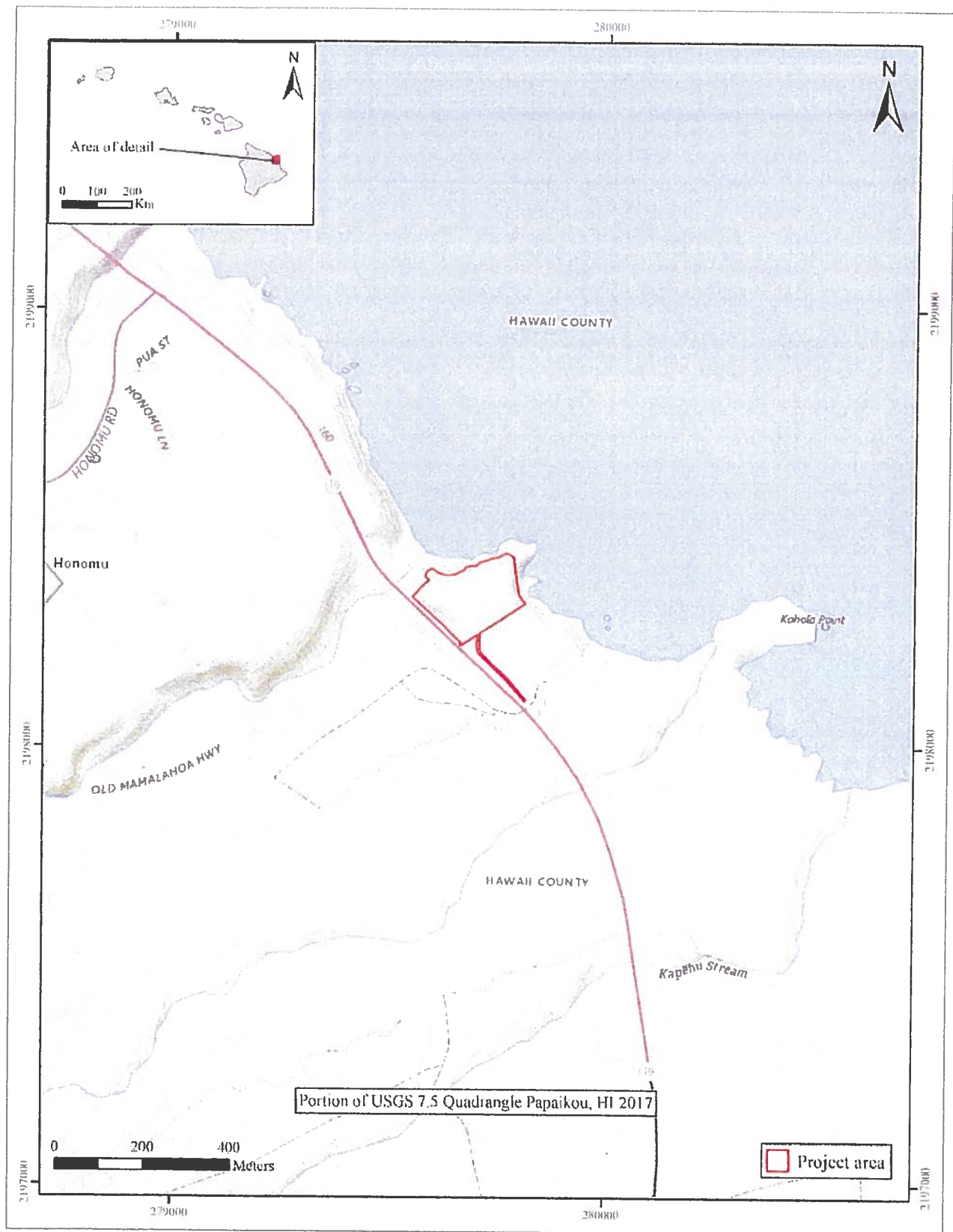


Figure 1. Project area location.

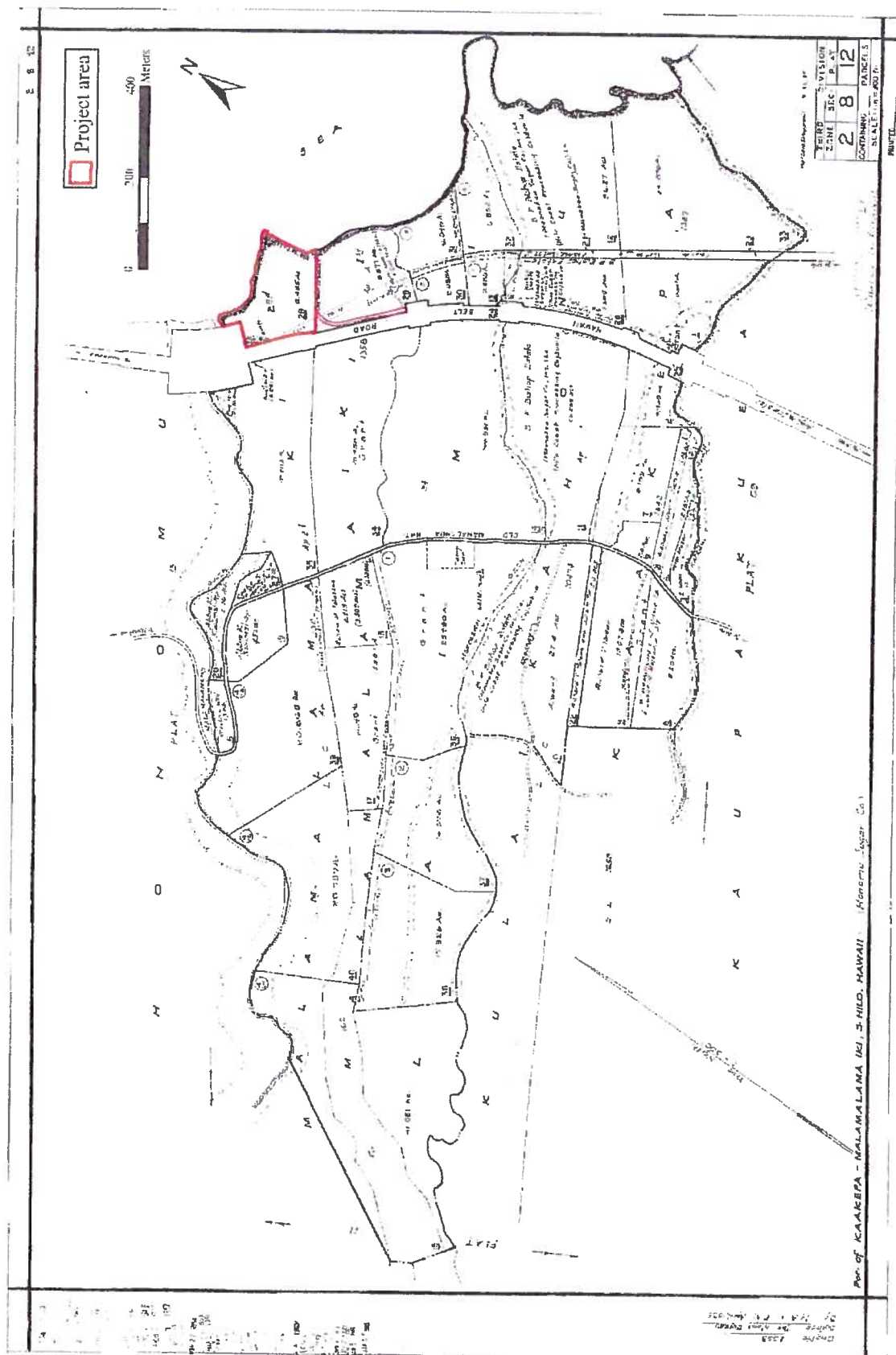


Figure 2. Tax Map Key (3) 2-8-012 showing location of current study parcel (028).



Figure 3. Google Earth™ satellite image showing the current project area.

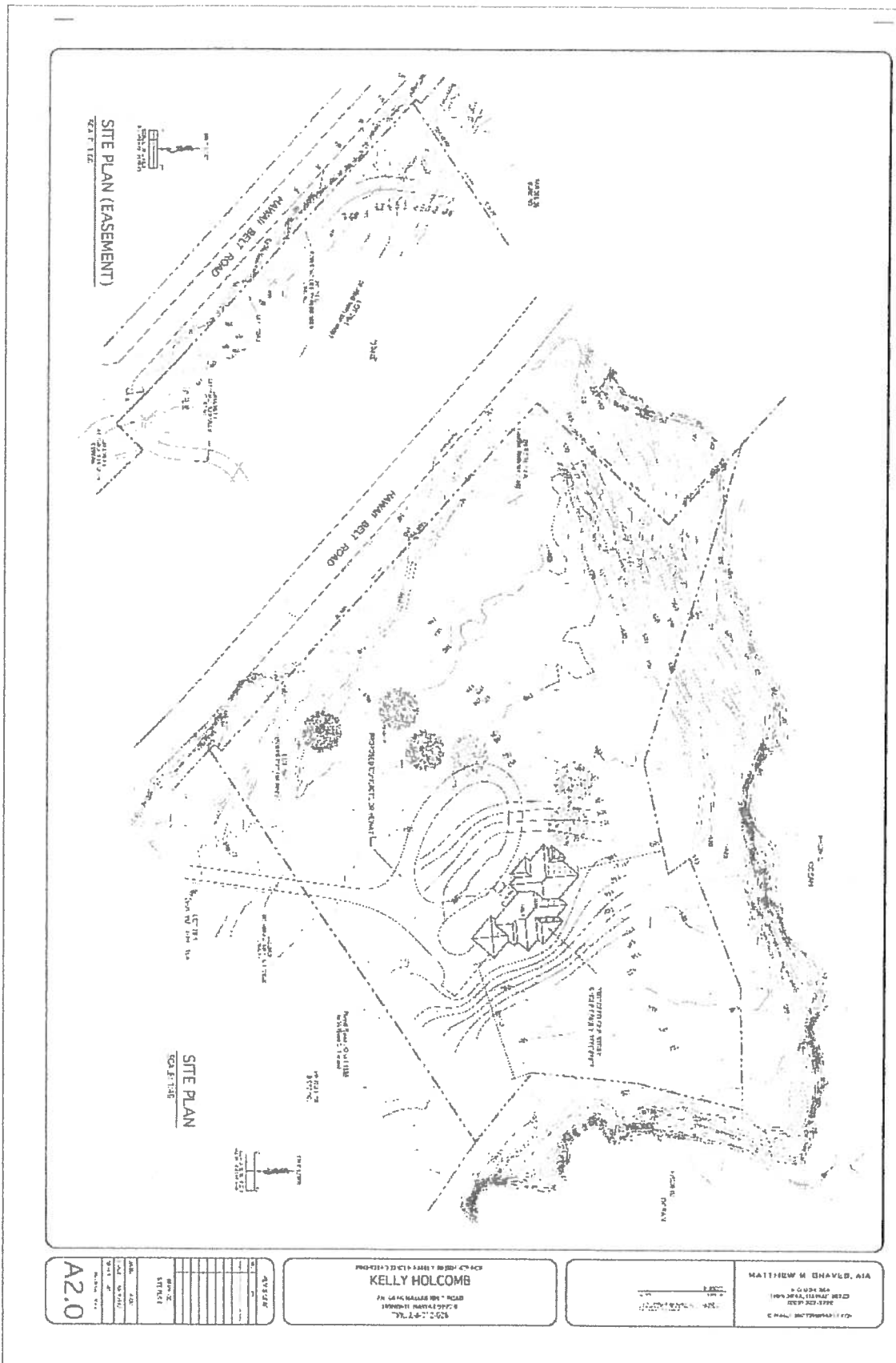


Figure 4. Proposed development plans.

PROJECT AREA DESCRIPTION

The current project area consists of approximately 6.5 acres of Conservation District land, located along the South Hilo coastal sea bluffs, approximately 0.9 kilometers *makai* of the town of Honomū, and just *makai* of the Māmalahoa Highway, within Mālamalamaiki 1st and 2nd Ahupuaʻa, Island of Hawaiʻi (Figure 5). Access to the property is through a gated, overgrown easement located along the *makai* edge of the Highway. The gated easement begins at the southwestern corner of the neighboring parcel to the south (TMK: (3) 2-8-012:029), and extends northwest for approximately 200 meters before entering into the subject parcel (Figure 6). The roughly square-shaped subject parcel is comprised of relatively level tableland, with elevations ranging from 45 to 150 feet (14-46 meters) above sea level, and is bounded to the east by the rocky coastal cliffs and the Pacific Ocean, to the north by the steep sided Mālamalamaiki Gulch, to the west by the Māmalahoa Highway right of way, and to the south by an undeveloped parcel. A hog wire fence line defines the boundary of the two parcels along this southern edge. The Honomū Stream flows through the Mālamalamaiki Gulch where it empties into the sea along the northern edge of the subject parcel (Figure 7). The former route of the Hawaiʻi Consolidated Railroad (Site 50-10-26-24212), evidenced by a deep cut in the terrain, extends northwest to southeast along a portion of the parcel's western boundary.

As a result of nearly a century of sugarcane cultivation, the terrain within the majority of the project area consists of level soil covered primarily in invasive plants species. The ground surface in the level central portion of the property is covered by a thick, tall growth of Guinea grass (*Megathyrsus maximus*) and molasses grass (*Melinis minutiflora*) (Figure 8). The outer edges of the parcel along the project area boundaries are more thickly vegetated, and covered in a dense growth of mostly invasive trees, shrubs and vines (Figure 9 and 10). Dominant species observed in these areas include gunpowder trees (*Trema orientalis*), guava (*Psidium sp.*), night blooming jasmine (*Cestrum nocturnum*), lantana sp., Bing-a-Bing (*Macaranga mappia*), African Tulip (*Spahodea campanulate*), ginger sp. and various other grasses and vines. Along the coastal edges of the property are groves of *hala* (*Pandanus tectorius*) intermixed with ironwood trees (*Casuarinaceae equisetifolia*) and ti plants (*kī*; *Cordyline fruticosa*) (Figure 11). A grove of Alexander palm trees (*Ptychosterma elegans*) extends along the western edge of the parcel within the former route of the Hawaiʻi Consolidated Railroad (Site 50-10-28-24212) (Figure 12).

Located just outside of the eastern property boundary and along the coastline, is a wooden ladder that descends down from the cliff to the rocky shoreline below (Figure 13 and 14). Although this ladder is outside the project area boundaries, it is worth noting that in more recent times, it appears the coastal cliffs that bound the subject parcel have been utilized to access the marine resources along this portion of the coast. In addition, located near to the edge of the Mālamalamaiki Gulch and the parcel's northern boundary, is a modern rubbish pile which appears to be the remnants of a small camp site.

Soils within the study area (Figure 15) are classified Hilo hydrous silty clay loam on 10-20 percent slope (Soil Survey Staff 2017). These strongly acidic soils dehydrate irreversibly into fine gravel size aggregates, and have formed over basalt that originated from Mauna Kea Volcano 64,000 to 300,000 years ago (Figure 16) (Sherrod et al. 2007). These soils have historically been used for the cultivation of sugarcane. The study area receives a mean annual rainfall of approximately 3,500 millimeters, with the majority of the rain occurring during the spring months, with the most rainfall typically occurring in March, and the least occurring in June (Giambelluca et al. 2013). The climate is generally cool, with a mean annual temperature ranging from 72 to 77 degrees Fahrenheit throughout the year.



Figure 5. Aerial image of project area, view to the west.



Figure 6. Gated entrance and dirt road which leads to the subject parcel, view to the north.



Figure 7. Honomū Stream and Mālamalamaiki Gulch along the northern boundary of the project area.



Figure 8. Open grassy area within the central portion of the subject parcel, view to the southeast.



Figure 9. Aerial photograph of the project area, showing open grassy areas with dense vegetative growth along the parcel boundaries.



Figure 10. Dense vegetation along the western edge of the subject parcel, view to the northwest.



Figure 11. *Hala* grove intermixed with ironwood trees along the eastern coastal boundary of the parcel, view to the northeast.

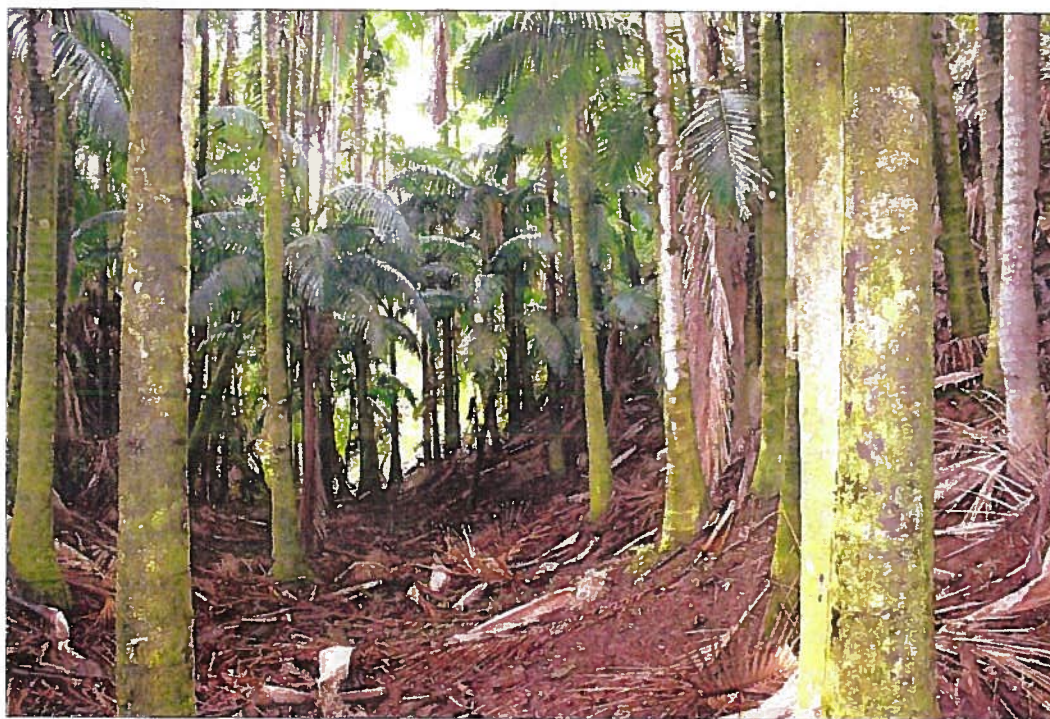


Figure 12. Alexander Palm grove within the former route of the Hawai'i Consolidated Railroad along the western edge of the parcel, view to the south.



Figure 13. Wooden ladder descending the coastal cliff to the rocky shoreline below.

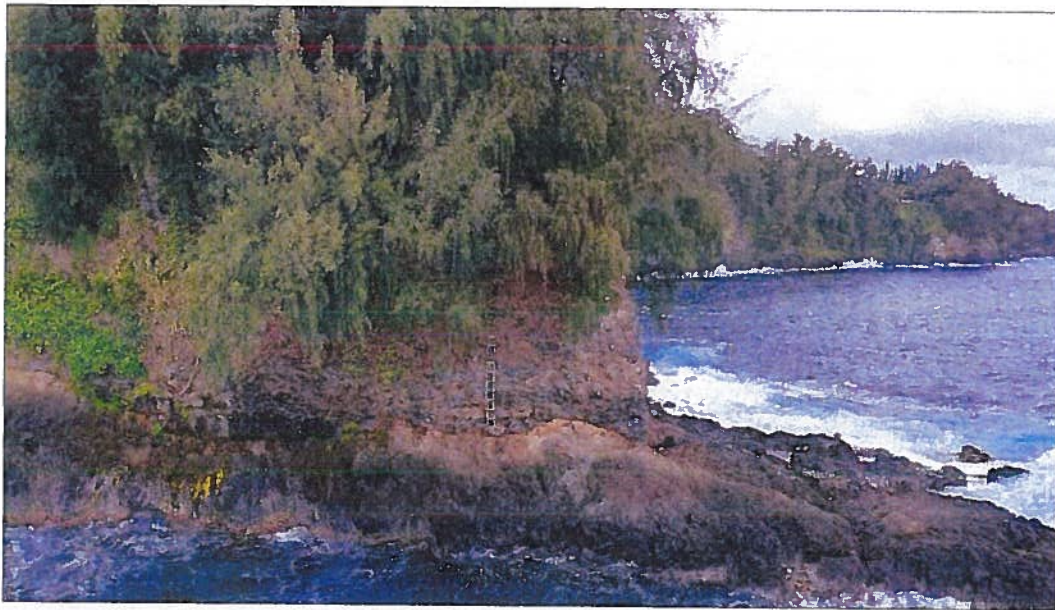


Figure 14. Aerial of coastline (outside of the project area boundaries) showing a wooden ladder descending down the cliff face the rocky shoreline below, view to the northwest.

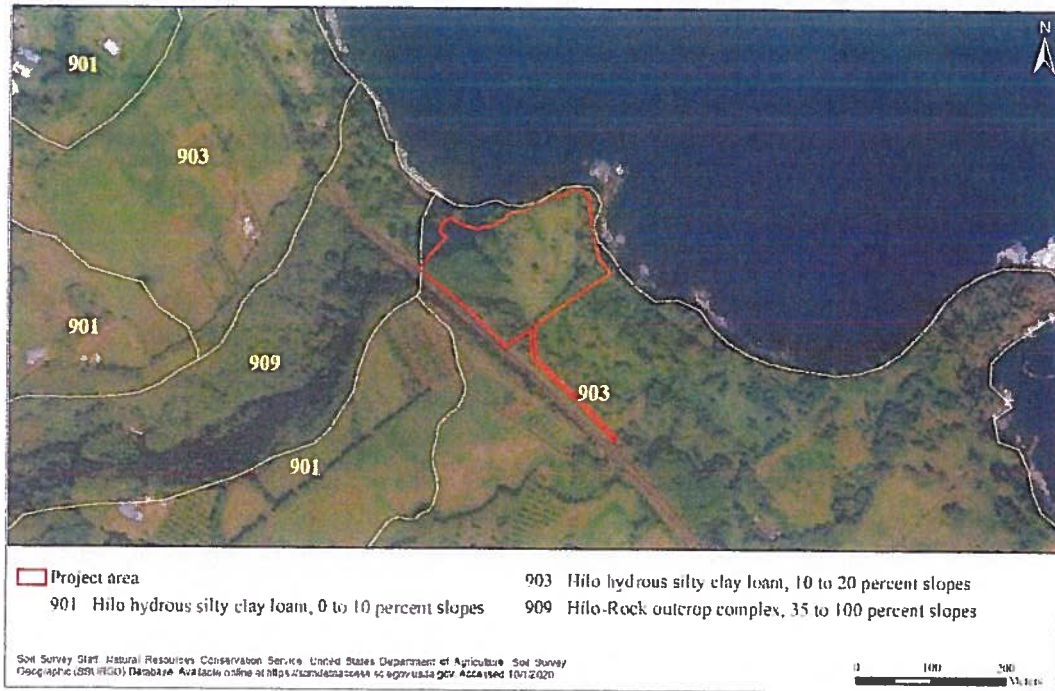


Figure 15. Soils in the vicinity of the current project area (outlined in red).

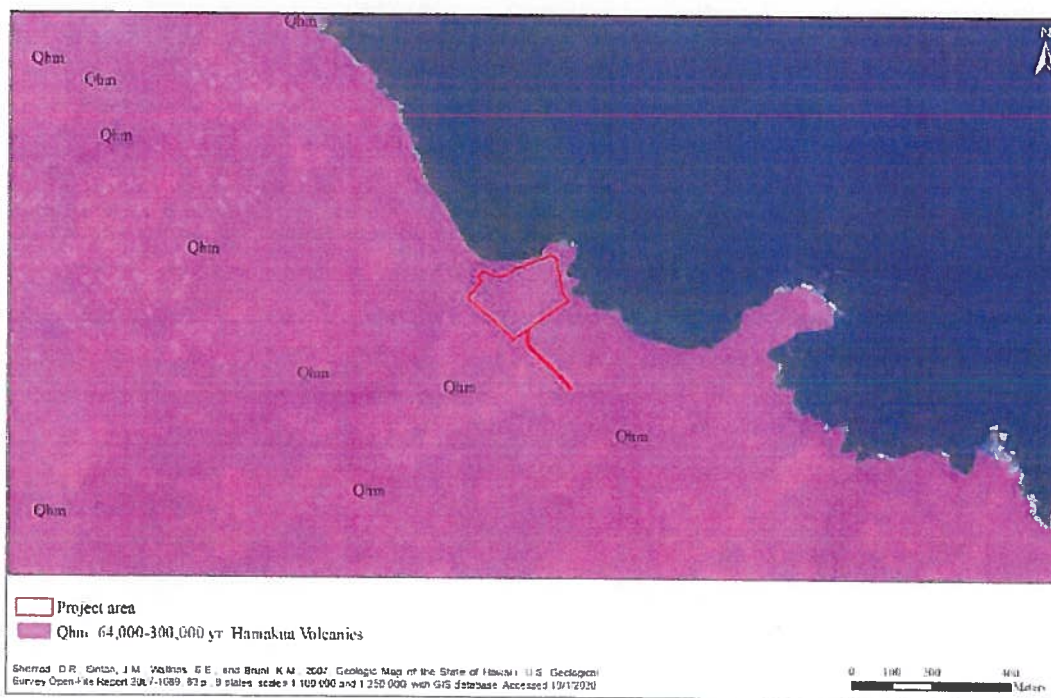


Figure 16. Geologic units in the vicinity of the current project area (outlined in red).

2. BACKGROUND

To generate a set of expectations regarding the nature of archaeological resources that might be encountered within the current study area, and to establish an environment within which to assess the significance of any such resources, a general culture-historical context for the South Hilo region that includes specific information regarding the known history of Mālamalamaiki 1st and 2nd Ahupua'a and the study area is presented. This is followed by a discussion of relevant prior archaeological studies conducted in the vicinity of the study area.

CULTURE-HISTORICAL CONTEXT

The study area is situated in the Ahupua'a of Mālamalamaiki 1st and 2nd on the windward coast of Hawai'i Island, within the present-day district of South Hilo, and the traditional *moku* (district) of Hilo, one of six *moku* of Hawai'i Island (Figure 17). The chronological summary presented below begins with a discussion of the general settlement patterns for South Hilo. The discussion of Prehistory is followed by a summary of Historical events in the district that begins with the arrival of foreigners in the islands and then continues with the history of land use in South Hilo after contact. The summary includes a discussion of the changing lifeways and population decline of the early Historic Period, a review of land tenure in the study ahupua'a during the *Māhele 'Āina* of 1848, and documentation of the transition to the commercial sugar industry from the last quarter of the nineteenth century into the twentieth century. A synthesis of the Precontact settlement patterns and the Historically documented land use, combined with a review of the findings of previously conducted archeological studies, provides a means for predicting the types of archaeological features that may be encountered within the study area, and forms a basis for assessing the function, age, and significance of any encountered archaeological sites.

Mālamalamaiki 1st and 2nd ahupua'a and the Greater South Hilo District

The current project area is in the ahupua'a of Mālamalamaiki 1st and 2nd, and is bounded by Laimi Ahupua'a to the south, and the Honomū Stream to the north. "Mālamalamaiki" is translated in Pukui et al. (1974:143) as "little light." This narrow ahupua'a is located in the traditional district of Hilo, which is one of six districts on Hawai'i Island (Figure 17). Traditionally, the district of Hilo was divided into three *'okana* (sub-districts). Mālamalamaiki 2nd is located in the *'okana* of Hilo Palikū, which extends north of the Wailuku River to Ka'ula Gulch, oftentimes characterized by its upright and densely vegetated cliffs and broad *kula* (plains) lands.

The abundance of streams, valleys, and gulches in this region made for a difficult and treacherous pass. In "Ka Huakaihele ike i na Makaainana o Hilo" (A Sightseeing Tour to Visit the Common Folk of Hilo), an account by G.K. Mahoe (1876), of his travels throughout Hilo that was serialized in the Hawaiian language newspaper *Ka Lahui Hawaii*. The account has been translated from Hawaiian to English. He describes Hilo Palikū as such:

...I am protected from the long path ahead. I did not think twice of the dark cliffs of Hilo Palikū, the inclines, the descents, the ravines, the streams, the mountaintops, and the cleared fields, I moved alone, without thinking much of the strain and discomfort of traveling, although, when I recalled the length between Hilo One and Laupāhoehoe, those thirty miles came and went. The reader should not be mistaken, the lands that are passed along the way are not clear and smooth, rather, there are many hills, gulches, and twisting roads. (Mahoe G.K. 1876:1)

King David Kalākaua also provided a concise description of this region's rough geography, but also includes a description regarding the density of the population there in his book *The Legends and Myths of Hawaii* (Kalākaua 1888):

The northeastern coast of the island of Hawaii presents an almost continuous succession of valleys, with intervening uplands rising gently for a few miles, and then more abruptly toward the snows of Mauna Kea and the clouds. The rains are abundant on that side of the island, and the fertile plateau, boldly fronting the sea with a line of cliffs from fifty to a hundred feet in height, is scored at intervals of one or two miles with deep almost impassable gulches, whose waters reach the ocean either through rocky channels worn to the level of the waves, or in cascades leaping from the cliffs and streaking the coast from Hilo to Waipio with lines that seem to be molten silver from the great crucible of Kilauea.

In the time of Liloa, and later, this plateau was thickly populated, and requiring no irrigation, was cultivated from the sea upward to the line of frost. A few *kalo* patches are still seen, and bananas grow, as of old, in secluded spots and along the banks of the ravines; but the broad acres are green

2. Background

with cane, and the whistle of the sugar-mill is heard above the roar of the surf that beats against the rock-bound front of Hamakua. (Kalākaua 1888:284)

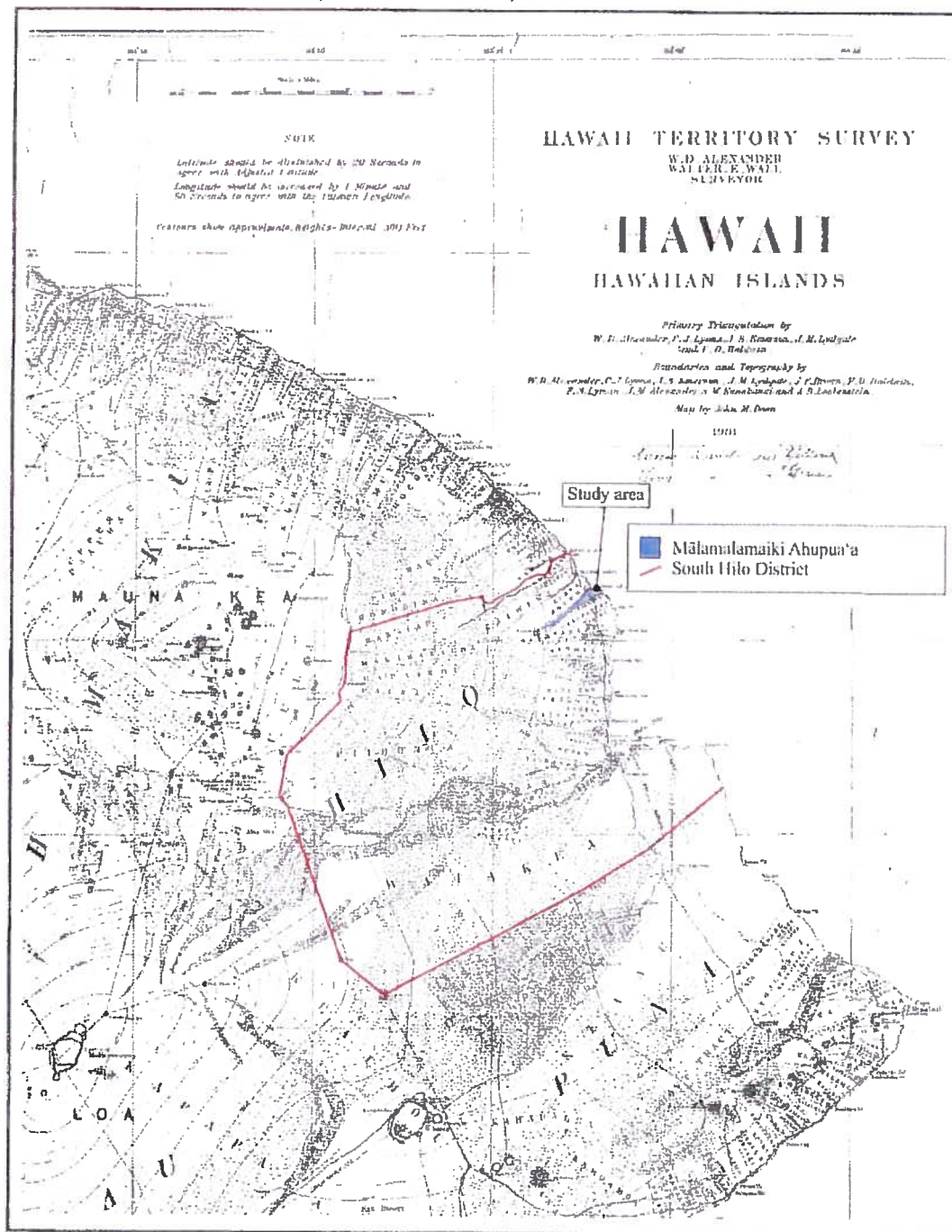


Figure 17. A 1901 Hawaii Territory Survey map showing the location of the study area within Mālamalamaiki and Lā'imi ahupuna'a and South Hilo District.

The low-lying coastal areas of South Hilo thrived with traditional Hawaiian habitation and cultivation. Within the larger gulches and broad plateaus (*kula*) regions, were lush, fertile lands well suited for agriculture. The staple traditional crop, *kalo* (taro), was cultivated in irrigated terraces along the stream edges while *'uala* (sweet potato), *mai'a* (banana) and *kō* (sugarcane) were grown in the wet *kula* lands of the lower forest zone (Handy et al. 1991). The region had an abundance of *kukui* (candlenut), *'ulu* (breadfruit), and *niu* (coconut) groves and was also rich in marine resources. Although settlements were prominent in these areas, with the increase of population and agricultural

production settlements spread into the upland *kula* regions. Handy and Handy (1972), in drawing from a description given by early missionary William Ellis, provide yet another description of the fertile landscapes of South Hilo:

The light and fertile soil is formed by decomposing lava, with a considerable portion of vegetable mould. The whole is covered with luxuriant vegetation, and the greater part of it formed into plantations, where plantains, bananas, sugar-cane, taro, potatoes and melons, come to the greatest perfection. Groves of cocoa-nut and bread-fruit trees are seen in every direction, loaded with fruit, or clothed with luxuriant foliage. (Ellis in Handy and Handy 1972:539)

Place Names for Mālamalamaiki

The names (*Inoa*) of places (*wahi*), rains (*ua*), and winds (*makani*) within a particular *ahupua'a* or broader region evidences the long-term relationship of various communities to their immediate environment. Reacquainting ourselves with these place, rain and wind names allow us to appreciate the environment as it was once observed by ancestral Hawaiian populations. In Mālamalamaiki, a few place names are listed by Soehren (2005) as markers for the boundaries of these *ahupua'a* (Table 1).

Table 1. Place names in Mālamalamaiki

Place Names	Notes
Kaloa'awapuhii	Translated as "the many wild gingers." A place that served as a boundary marker between Mālamalamaiki and Lā'ini in the upper regions of the <i>ahupua'a</i> .
Kapo'alua	Translated as "the second night." A marshy area good for growing taro that was located at the boundary of Honomū, Lā'ini, and Mālamalamaiki.
Mana'onui	Translated as "important matter." A rock that marked the boundary between Mālamalamaiki and Honomū located on the northern bank of Honomū stream.
Mo'omo'ohualoa	Translated as "long-haired mo'o." A stream marking the boundary of Mālamalamaiki and Honomū.
Waihaka	Translated as "watery perch." A stream that served as a boundary marker between Honomū and Mālamalamaiki.

Mele (songs) are valuable sources of information for the place names of particular areas that were published frequently in Hawaiian language newspapers and in other primary sources. A honorific song in honor of a person (*mele inoa*) was published in the O'ahu-based Hawaiian language newspaper *Ka Nupepa Kuokoa* on February 17, 1872. The *mele inoa* was penned on February 5 and was written for a woman named Kaiewe, the eldest child of B. Kuhea, by multiple relatives and family friends living in Kuhua (the *ahupua'a* immediately north of Honomū). A verse written by a woman named Lila honors Kaiewe and lists adjacent *ahupua'a* such as Lā'ini and Ka'akepa in the *mele inoa*. Although the original text does not include diacritics, *kahakō* (macrons to elongate vowels) and *'okina* (glottal stops) are included to conform to modern Hawaiian orthography and to aid in translating the text. Wind, rain, and place names are bolded for emphasis:

<i>A uka au o 'Akaka</i>	I am in the uplands of 'Akaka
<i>Ha'a na ka lehua i ka wai</i>	The lehua blossoms droop from the abundance of water
<i>'O ka ne'e a ka ua lokuloku</i>	The lokuloku rains inch along
<i>Wala'au i ka lau lā'au</i>	There is chattering in the forest
<i>Hone ana ka leo o ka manu</i>	The sweet sound of birds
<i>Ka'i'i 'ana i ka nāhele</i>	Shrilling in the forest
<i>'O ka hele ala ka ma'eu</i>	Traveling afar are these sounds
<i>Ka'ulua 'ole iho ka mana'o</i>	My thoughts are not remiss
<i>Pilipili 'āina 'ole mai</i>	They do not come near the land
<i>Iluna au o Hale Rose</i>	I am above Hale Rose
<i>Ho'olohe i ke kani o ka pio</i>	Listening to the sound of chirps
<i>Akahi no a olu pono mai</i>	Never before have I been pleasantly comforted
<i>Ka manao lauili i ka hoa</i>	By these circuitous thoughts of a companion
<i>Me oe ke aloha pau ole</i>	With you is my endless love
<i>O Kaiewe no he inoa</i>	Indeed, Kaiewe is your name

*A luna au o Lā'imi
'O ka waiho a'e a Ka'akepa
'Ike i ka lau o ke kō
'O ka welo a ka Hae Hawai'i
Ua pulu i ka ua liilii
Ia hona i ka mālualua
I ka pā kolonahe ma kai*

I am in the uplands of Lā'imi
Left in Ka'akepa
I see the leaves of the sugarcane
The waving fluttering of the Hawaiian flag
Moistened by scattered showers
Fortunate to feel the mālualua wind
Gently blowing by the ocean

*A kai au o ke Awaiki
Hāliu au nānā iā uka
'O ka holu a ka lau 'Īnia,
'I'ini aku ana ka mana'o
E 'ike i ka hoa i ka 'ili
Me 'oe ke aloha pau 'ole
'O Kaiewe no he inoa*

I head seaward to Awaiki
I turn my attentions towards the uplands
The Pride-of-India (Chinaberry) leaves sway
My thoughts desire
To see my close friend
With you is my endless love
Indeed, Kaiewe is your name (Lila 1872:3)

Early Historical Accounts 1820-1848: A Land in Transition

In October of 1819, seventeen Protestant missionaries set sail from Boston to Hawai'i. They arrived in Kailua-Kona on March 30, 1820 to a society with a religious void to fill. Many of the *ali'i*, who were already exposed to western material culture, welcomed the opportunity to become educated in a western style and adopted their dress and religion. Soon they were rewarding their teachers with land and positions in the Hawaiian government. During this period, the sandalwood trade wrought havoc on the lives of the commoners, as they weakened from the heavy production, exposure, and famine just to fill the coffers of the *ali'i*, who were no longer under any traditional constraints (Kuykendall and Day 1976; Oliver 1961). The lack of control of the sandalwood trade was to soon lead to the first Hawaiian national debt as promissory notes and levies were initiated by American traders and enforced by American warships (Oliver 1961). The Hawaiian culture was well on its way towards Western assimilation as industry in Hawai'i went from the sandalwood trade, to a short-lived whaling industry, to the more lucrative, but environmentally destructive sugar industry.

Some of the earliest written descriptions of the South Hilo district come from the accounts of the first Protestant Missionaries to visit the island. Early Historic visitors to the region noted the beauty, fertility, and ruggedness of this part of the island. In 1823, the Reverend William Ellis one of the first Christian missionaries to arrive in Hawai'i, passed along the South Hilo coast during his tour of Hawai'i Island. Having been warned against walking due to the ruggedness of the terrain, he sailed from Hilo to Laupāhoehoe in a canoe. Ellis (Ellis 2004:344) described the South Hilo coastline as follows:

The country, by which we sailed, was fertile, beautiful, and apparently populous. The numerous plantations on the eminences and sides of the deep ravines or valleys, by which it was intersected, by streams meandering through them into the sea, presented altogether a most agreeable prospect.

After departing Hilo Bay, Ellis and his party did not land again until Laupāhoehoe, where he and his traveling companions continued on foot, passing along the coastal cliffs of the Hilo and Hāmākua districts. It was on this leg of his journey that Ellis described the cultivated *kula* lands of the region that extended between the various valleys and gulches:

The houses stood mostly singly, and were scattered over the face of the country. A rich field of potatoes or taro, five or six acres in extent, or large plantations of sugar-cane and bananas, occasionally bordered our path. But though the soil was excellent, it was only partially cultivated. (Ellis 2004:249-250).

Planting techniques within the *kula* lands of the Hāmākua region are further described by Handy and Handy (1972). Although the current project area is located to the south of Hāmākua, the *kula* lands of the Hāmākua and Hilo districts are very similar, and Handy and Handy's description of dryland cultivation within the region provides some insight to how the land was used prior to the advent of the sugarcane industry, which drastically changed the landscape. Handy and Handy (1972:537) state:

Mulched taro was planted on the open *kula* lands up to the border of the old forest zone and is said to have flourished under a mulch of grass, *ti* leaves, and other rubbish heaped around it in the red soil. Small patches so growing today seem to flourish. We are told that taro was planted in kukui

forests which used to cover the slopes of much of the land... Another method consisting of digging sizable holes in the ground, filling them with *kukui* leaves, and allowing these to decay completely, after which taros that had been started from cuttings planted in plain soil were introduced and grew to great size.

Overland travel across the central and northern Hilo District remained difficult throughout the first part of the nineteenth century due to its rugged coastline and many deep gulches. Transportation difficulties may have even temporarily delayed large-scale commercial exploitation of the *kula* lands in the vicinity of the study area (Desilets and Rechtman 2004). Initial commercial exploitation of these lands was limited to small scale agriculture in areas with coastal access for shipping and receiving goods. The Reverend Titus Coan (Coan 1882:31-32), who settled at the Hilo Mission Station in 1835, wrote that:

For many years after our arrival there were no roads, no bridges, and no horses in Hilo, and all my tours were made on foot... The path was a simple trail, winding in a serpentine line, going down and up precipices, some of which could only be descended by grasping the shrubs and grasses, and with no little weariness and difficulty and some danger.

By the mid-1800s, the first roads had been established along the coast of South Hilo, perhaps following the route of the older path described by Coan (PHRI 1991). These first roads, designed for travel on horses and in carts, were likely developed by land holders, primarily sugar growers, looking to connect their plantation lands. Chester S. Lyman, travelling from Kawaihae to Hilo with the Reverend Titus Coan on June 19th, 1846, stayed in the vicinity one of the early sugar plantations located to the south of the study area. In his journal he described travel along a cart road and discussed the holdings of Mr. Castle, the progenitor of the first sugar plantation in the area. Lyman (1925:81) writes:

After resting we started on at 4 1/2 & soon arrived at Mr Castle's, 3/4 of a mile beyond. When half way there we fell in with two carts each drawn by 4 yokes of oxen, one set of them just broken in; the two teams were connected by a long rope & went on by *fits & starts*, now stopping & now going on the run. The carts were large & heavy with thick solid wheels made of planks pinned together. They were well filled with a crowd of noisy girls & boys & by invitation of the Driver, an American, I took a ride in one of these Hawaiian Coaches as far as Mr Castle's house, glad thus to relieve a little my feet which were becoming sore from walking in water and climbing precipices.

Stopped a few minutes at Mr C[astle]'s; were entertained with a refreshing bowl of milk, & then going on a mile & a half or 2 miles put up for the night at a native house, nearby. The place is called *Puumoi*. Mr. Castle is an American, has been in the country many yrs, has an extensive plantation & a native wife & family. Near his house we passed large fields of sugar cane on his lands, but cultivated by Chinamen who have pretty much monopolized the sugar business in this region. Mr C[astle] has also considerable herds of cattle.

The arduous journey along the South Hilo coastline is again referenced in an article written by Henry L. Sheldon which was published on December 9, 1882 in the English-language newspaper *Saturday Press* and can be found in the 44th installment of *Reminiscences of Honolulu Thirty-five Years*, a serial account that was published by Henry L. Sheldon between 1881 to 1883. This historical account references Mālamalamaiki as well as the renowned Dr. John Pelham who resided within the study ahupua'a at the time. In the article, Sheldon notes the death of Dr. John Pelham on March 16th 1857, an Englishman who served as a medical adviser to the *ali'i* Kālaimoku, Kuakini, and Ka'ahumanu. Following this note about Pelham's demise, Sheldon reminisces about a visit with Pelham years prior:

[Pelham] had resided in the Islands since the year 1826, and was the medical adviser of the high chiefs Kalaimoku, Kuakini and Kaahumanu. He was well educated and well read in his profession, but quite eccentric in his manner. Some six years previous to his death he was living at a place called **Malamalamaiki**, about fifteen miles north of Hilo, where I had occasion to call upon him while on a tour around the Island of Hawaii. Arriving at his very neat and comfortably arranged and furnished thatched cottage about 8 o'clock in the evening, in the midst of one of those soaking rains for which Hilo was then proverbial (The climate is said to have changed since), I received from the Doctor a bluff but hearty welcome, and the intimation that supper would be ready as soon as I had exchanged my drenched garments for dry ones. I was desperately hungry after my long ride from the bay, and visions of roast pig and taro, or mullet baked in ti-leaves, flitted through my mind. At length I was ceremoniously ushered into the dining-room, and, with the remark from my host that I must excuse him for that he had already supped, was hospitably urged to "eat hearty"--of a *raw squid* and poi! That was the entire bill of fare. I was, however, equal to the occasion, and managed to bolt--it was impossible to thoroughly masticate--enough of octopus and paste to stay my stomach. I had been

previously informed of Pelham's eccentricities. and noted the twinkle of his eye while I wrestled with "the supper." At the conclusion of the necessarily brief repast the Doctor invited me to join him in "a glass of something hot." Directly a native woman brought in a japanned tray, on which were two steaming tumblers crowned with closed lemon. After such a barbarous supper this seemed the opposite extreme of civilized luxury. I sipped contentedly at the soothing mixture; but was only restrained from remarking upon its peculiar aroma by my regard for the proprieties. The evening was spent in pleasant converse, in the course of which the Doctor related many interesting recollections of the native chiefs with whom he had been familiar, especially of Governor Adams, as Kuakini was called. I was comfortably lodged (even luxuriously, for those days), and in the morning sat down to a nice breakfast of pork chops, *lawalu* 'd fish, baked potatoes, biscuit and coffee. Noticing the satisfaction with which I regarded the board, my host dryly remarked that he had been pleased to see that I knew how to "rough it" in Hawaii, by the way in which I had attacked raw squid the previous evening, whereupon I was emboldened to inquire as to the particular brand of spirits that had entered into the composition of the hot punch with which I had washed the supper down. For reply he produced from the cupboard two small empty bottles, marked in plain letters, "Lavender Water." with the simple remark, "There."

Lest my readers should suppose that our punch on the occasion mentioned was made of the article generally known as lavender water, I will here explain: Previous to the ratification of the treaty with France in 1858 the duty on imported spirits in this kingdom was \$5 per gallon. One of the results of the high duty was the important of large quantities of alcohol, disguised under the names of cologne, lavender, bitters, etc., which paid a duty of only 5 per cent, *ad valorem*, and which was freely sold all over the islands and used as a beverage instead of the high-priced brandy. Brandied peaches, cherries and other fruits came under the same category, and were at one time largely imported and consumed here. (Sheldon 1882:1).

In 1872, Isabella Bird traveled by horseback along the North and South Hilo and Hāmākua Coast from Onomea to Waipi'o Valley and described the general terrain and the difficult passage through the various gulches she crossed. Although Honomū is not specifically mentioned in her account, she would have inevitably passed through the Honomū area on her journey towards Waipi'o. Of the region she writes:

All the gulches for the first twenty-four miles contain water. The great Hakalau gulch we crossed early yesterday, has a river with a smooth bed as wide as the Thames at Eton. Some have only quiet streams, which pass gently through ferny grottoes. Others have fierce strong torrents dashing between abrupt walls of rock, among immense boulders into deep abysses, and cast themselves over precipice into the ocean. Probably, many of these are the courses of fire torrents, whose jagged masses of a-a have since been worn smooth, and channeled into holes by the action of water. A few are crossed on narrow bridges, but the majority are forded, if that quiet conventional term can be applied to the violent flounderings by which the horses bring one through. (Bird 1974:88).

Bird's detailed and colorful accounts provide a vivid glimpse into the early nineteenth century environs and native lifeways of the South Hilo District.

The lowland portion of South Hilo was clearly a region thriving with traditional Hawaiian habitation and cultivation. Like most other parts of Hawai'i, introduced diseases and global economic forces would have a devastating impact on traditional life-ways in the early to mid-1800s. Due to its rugged coastline and many deep gulches, however, transportation difficulties were severe in South Hilo, North Hilo, and Hāmākua. This served to delay large-scale commercial exploitation of the *kula* lands. In the second half of the nineteenth century these problems were overcome and sugar cane plantations replaced subsistence agriculture and grazing as the dominant land use.

The Legacy of the *Māhele* 'Āina of 1848

By the mid-nineteenth century, the ever-growing population of Westerners in the Hawaiian Islands forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership. By 1840 the first Hawaiian constitution had been drafted and the Hawaiian Kingdom shifted from an absolute monarchy into a constitutional government. Convinced that the feudal system of land tenure previously practiced was not compatible with a constitutional government, the King (Kamehameha III) and his high-ranking chiefs decided to separate and define the ownership of all lands in the Kingdom (King n.d.). This change was further promoted by missionaries and Western businessmen in the islands who were generally hesitant to enter business deals on leasehold lands that could be taken from them at any time. After much consideration, it was decided that three

classes of people each had one-third vested rights to the lands of Hawai'i: the King, the chiefs and *konohiki*, and their tenants (the *maka 'āinana* or common people). In 1845 the legislature created the "Board of Commissioners to Quiet Land Titles" (more commonly known as the Land Commission. All land claims, whether by chiefs for entire *ahupua'a* or by tenants for their house lots and gardens, had to be filed with the Land Commission within two years of the February 14, 1846, but the deadline was extended several times for chiefs and *konohiki* (Soehren 2005).

The King and some 245 chiefs (Kuykendall 1938) spent nearly two years trying unsuccessfully to divide all the lands of Hawai'i amongst themselves before the whole matter was referred to the Privy Council on December 18, 1847 (King n.d.). Once the King and his chiefs accepted the principles of the Privy Council, the *Māhele 'Āina* (Land Division) was completed in just forty days (on March 7, 1848), and the names of all of the *ahupua'a* and *'ili kūpono* (nearly independent *'ili* land division within an *ahupua'a*, that paid tribute to the ruling chief and not to the chief of the *ahupua'a*) of the Hawaiian Islands and the chiefs who claimed them, were recorded in the *Māhele Book* (Soehren 2005). As this process unfolded King Kamehameha III, who received roughly one-third of the lands of Hawai'i, realized the importance of setting aside public lands that could be sold to raise money for the government and also purchased by his subjects to live on. Accordingly, the day after the division with the last chief was recorded in the *Buke Māhele* (*Māhele Book*), King Kamehameha III commuted about two-thirds of the lands awarded to him to the government (King n.d.). Unlike the King, the chiefs and *konohiki* were required to present their claims to the Land Commission to receive their awards (LCAw.). The chiefs who participated in the *Māhele* were also required to provide to the government commutations of a portion of their lands in order to receive a Royal Patent giving them title to their remaining lands. The lands surrendered to the government by the King and chiefs became known as "Government Land," while the lands retained by Kamehameha III became known as "Crown Land," and the lands received by the chiefs became known as "*Konohiki Land*" (Chinen 1958:vii; 1961:13). All lands awarded during the *Māhele* were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This process expedited the work of the Land Commission.

During the *Māhele*, native tenants of the lands that were divided up among the Crown, *Konohiki*, and Government could claim, and acquire title to, *kuleana* parcels that they actively lived on or farmed. The Board of Commissioners oversaw the program and administered the *kuleana* as Land Commission Awards (LCAw.). Claims for *kuleana* had to be submitted during a two-year period that expired on February 14, 1848 to be considered. All of the land claimants were required to provide proof of land use and occupation, which took the form of volumes of native registry and testimony. The claims and awards were numbered, and the LCAw. numbers, in conjunction with the volumes of documentation, remain in use today to identify the original owners and their use of the *kuleana* lands. The work of hearing, adjudicating, and surveying the claims required more than the two-year term, and the deadline was extended several times for the Land Commission to finish its work (Maly 2002). In the meantime, as the new owners of the lands on which the *kuleana* were located began selling parcels to foreigners, questions arose concerning the rights of the native tenants and their ability to access and collect the resources necessary for sustaining life. The "Enabling" or "*Kuleana Act*," passed by the King and Privy Council on December 21, 1849, clarified the native tenants' rights to the land and resources, and the process by which they could apply for fee-simple interest in their *kuleana*. The work of the Land Commission was completed on March 31, 1855. A total of 13,514 *kuleana* were claimed by native tenants throughout the islands, of which 9,337 were awarded (Maly 2002).

According to the *kuleana* land claim documents, on February 3, 1848, the *ali'i* Kekuapanio (also spelled Kuapanio) laid claim to three lands one of which included Mālamalamaiki Ahupua'a. This *ahupua'a* was subsequently awarded to him as *'āpana* (parcel) 2 of LCAw. 130. Testimony given prior on October 27, 1848 by John Young, one of Kamehameha I's foreign military advisors, specified that prior to the *Māhele 'Āina*, he had held Mālamalamaiki but at the request Poki (Boki, Governor of O'ahu), Mālamalamaiki was returned to King Kamehameha I. At the time of the *Māhele*, King Kamehameha I gave Mālamalamaiki to Kekuapanio, who was considered a *hulumanu*, a class of young nobles who were favorites of the chief. According to records obtained at the Olson Trust Archives, after Kekuapanio died, the land was retained by his heir, Huakini and later put up for public sale.

Kuleana Awards

As the King and his *ali'i* and *konohiki* made claims to large tracts of land via the *Māhele*, questions arose regarding the protection of rights for the native tenants. To resolve this matter, on August 6, 1850, the *Kuleana Act* (also known as the Enabling Act) was passed, clarifying the process by which native tenants could claim fee simple title to any portion of lands that they physically occupied, actively cultivated, or had improved (Garavoy 2005). The *Kuleana Act* also clarified access to *kuleana* parcels, which were typically landlocked, and addressed gathering rights within an *ahupua'a*. Lands awarded through the *Kuleana Act* were and still are, referred to as *kuleana* awards or *kuleana* lands.

2. Background

The Land Commission oversaw the program and administered the *kuleana* as Land Commission Awards (LCAws.) (Chinen 1958). Native tenants wishing to make a claim to their lands were required to register in writing those lands with the Land Commission, who assigned a number to each claim, and that number (the Native Register) was used to track the claimant through the entire land claims process. The native tenants registering their *kuleana* were then required to have at least two individuals (typically neighbors) provide testimony to confirm their claim to the land. Those testimonies given in Hawaiian became known as the Native Testimony, and those given in English became known as Foreign Testimony. Upon provision of the required information, the Land Commission rendered a decision, and if successful, the tenant was issued the LCAw. Finally, to relinquish any government interest in the property, the holder of a LCAw. obtained a Royal Patent Grant from the Minister of the Interior upon payment of the commutation fee. No *kuleana* claims were made for lands in Mālamalamaiki.

Government Land Grants

In conjunction with the *Māhele*, the King also authorized the issuance of Royal Patent Grants to applicants for tracts of land, larger than those generally available through the Land Commission. The process for applications was clarified by the “Enabling Act,” which was ratified on August 6, 1850. The Act resolved that portions of the Government Lands established during the *Māhele* of 1848 should be set aside and sold as grants ranging in size from one to fifty acres at a cost of fifty cents per acre. The stated goal of this program was to enable native tenants, many of whom were not awarded *kuleana* parcels during the *Māhele*, to purchase lands of their own. Despite the stated goal of the land grant program, this provided the mechanism that allowed many foreigners to acquire large tracts of the Government Lands. Unlike in the *kuleana* claims, where claimants stated their use of the land, the grant records are silent regarding the grantees’ intended use. The Royal Patent deeds and survey notes do contain some limited information about geographical features, vegetation, and survey markers, but they generally do not say anything about improvements to the land or land use.

South of the project area in Mālamalamaiki 1, a single grant parcel (Royal Patent No. 1358) was purchased in 1854 by William Farwell for \$51.50. While the location of this 52.6-acre grant is shown in Hawai‘i Registered Map No. 1092 by W. A. Wall (Figure 18), Farwell’s grant boundaries appear to be incorrectly depicted as it is shown extending well into Mālamalamaiki 2. Another Hawai‘i Registered Map No. 570 (Figure 18) dated 1879 does not show the location of Farwell’s grant but it does show other grants in nearby Honomū as well as what appears to be structures (depicted as square-like symbols) *mauka* and to the south of the project area. The 1879 map (see Figure 18) also shows the route of the Government Road *mauka* of the project area. The surveyor notes for Farwell’s grant described *hala* trees along the coast, as well as natural features such as the cliff and ravines as well as a road.

Figure 18. A portion of Hawai'i Registered Map No. 1092 showing the location of the project area and grant parcels in the vicinity.

Figure 19. A portion of Hawai'i Registered Map No. 570 by C. J. Lyons showing land grants in nearby Honomū as well as structures in the project area vicinity.

Honomū Sugar Company and Railroad Development (ca. 1880-1946)

Following the *Māhele* and the signing of the 1875 Treaty of Reciprocity, a free-trade agreement between the United States and the Kingdom of Hawai'i which guaranteed a duty-free market for Hawaiian sugar in exchange for special economic privileges for the United States, commercial sugarcane cultivation and sugar production became the central economic focus for the Hilo area. By 1874, Hilo already ranked as the second largest population center in the islands and within a few years the fertile uplands, plentiful water supply, and port combined to make Hilo a major center for sugarcane production and export. The plantation lands commonly extended some two to three miles inland from the coast (Best 1978:123). Elevations typically ranged from 250 feet above sea level along the shoreline bluffs to 2,000 feet above sea level at their western (*mauka*) limits. Ocean frontage could range from two to six miles. Railroads operating on steam and animal power were built on some plantations by 1887, however some plantations utilized flumes or cable railways to transport cane from the fields to the coastal mills.

With the annexation of Hawai'i to the United States in 1898 and the granting of Territory status in 1900, Hilo was designated the center of county government in 1905 and remained the second most populated city in the newly formed Territory of Hawai'i. Sugar cultivation continued to be the island's most lucrative industry until the ca. 1970s. The sugar industry brought widespread changes to the Hilo area and the drastically altered the traditional landscape of the district. As part of the late nineteenth century development of the sugar plantations and related infrastructure, some of Hilo's largest fishponds (Hanalei, Kalepolepo, Mohouli, Waiāhole, and Hoakunau) were filled in, and many old residences, burial sites, trails, *heiau*, formerly located in the cane fields were destroyed as a result.

In prospecting Hilo for land suitable for development, a report was made by the Royal Commissioners on Development of Resources. Formed by King David Kalākaua in 1877, commissioners conducted examinations of lands along the Hāmākua/Hilo coastline and consulted with residents in an effort to learn about needs and natural resources. In 1877, Honomū was investigated for its potential as a landing and sugar mill location:

At Honomu, in ordinary weather, a good landing can be made in a surf boat, and would only need a buoy; parties are projecting a small plantation on this land with a mill in the gulch. There are some 1500 acres of Government land in the vicinity, and 1250 sold to private parties, some of which is cane land. The establishment of a good mill at Honomu would greatly add to the value of these lands. (Maly and Maly 2006:48)

Three years later in 1880, M. Kirchoff & Company, along with C. Brewer & Company, Ltd. as agent, established Honomū Sugar Company on 2,400 acres of land within the South Hilo District, which would eventually include the current study area (Dorrance and Morgan 2000).

Boundary Commission Testimony (1886 and 1874)

As the Honomū Sugar Company continues to expand its operations, they began the process of acquiring adjacent tracts of land which eventually included the current project area. In 1862, the Commission of Boundaries (Boundary Commission) was established in the Kingdom of Hawai'i to legally set the boundaries of all the *ahupua'a* that had been awarded solely by name as a part of the *Māhele* 'Īna. Subsequently, in 1874, the Boundary Commission was authorized to certify the boundaries for lands brought before them. The primary informants for the boundary descriptions were old native residents who typically learned of the boundaries from an elder relative or neighbor. The boundary information was usually given in Hawaiian and simultaneously transcribed by the courts into English. The information described by the informants tell of natural and built features as well as traditional place names and its uses specific to Mālamalamaiki.

Testimony concerning the boundaries of Mālamalamaiki was collected on two separate occasions. The first hearing for the boundaries of Mālamalamaiki 1 occurred in June of 1874 and the second for Mālamalamaiki 2 was in August 1886. On June 30th, 1874 the Commissioners met at the Hilo Court House on the application of L. McCully, the attorney for Noa Kaikinui, to settle the boundaries of Mālamalamaiki 1. Prior to the hearing of testimony, P. Ama, a land surveyor provided the following statement concerning his survey of Mālamalamaiki 1:

Notes of survey filed by P. Ama; on May 1st 1874 presented by applicant. Ama took oath May 1st as to said Notes of survey. He said, I am a land surveyor and surveyed this land as Kauena pointed out boundaries to me, and copied Notes of survey from Patents of adjoining lands from the Kaupakuea hawaii I surveyed up the road to Ohiakiikii and not on the boundary, but surveyed across to boundary at flume

The first native primary informant was Kauena who was a multi-generational resident of Mālamalamaiki. According to notes from the testimony, Kauena was about 70 years old at the time of the hearing, thus placing his date

of birth sometime around 1804. Kauena's testimony as well as those provided by two other native informants, Kaiakoili and Nawai are provided below:

Kaunena k. Sworn

I was born at Malamalamaiki during the reign of Kamehameha I and have always lived there, and my forefathers before me. I was large enough to go about at the time of the battle of Kuamoo. Know the boundary of the land as it is a small one, and a trail is the boundary between the two Malamalamaiki. Know Ama and pointed out the boundaries between the two lands to him. He surveyed the one adjoining Honomu gulch, and he surveyed it as I pointed it out. He commenced at the mauka corner at Ohiakiikii a resting place on the road in the woods he then surveyed down the road to hawaii of Kaupakuea, not on the boundary. Thence towards Hamakua to where I pointed out the boundary between the two lands. Thence to Naomi's land on Malamalamaiki 1. (He surveyed as I told him without disputing the boundaries) From the mauka corner of Naomi's land to the shore the adjoining land has been sold. We went to shore and surveyed across from corner of land sold to Honomu gulch.

The Honomu gulch is on the Hamakua side of this land and is the boundary from shore to opposite Ohiakiikii where Malamalamaiki is cut off by Honomu: Bounded makai by the sea.

Kaiakoili k. Sworn

I went and carried the chain with Nawai when Ama surveyed the land Kauena was the kamaaina. Commenced at Ohiakiikii and surveyed across the land to Honomu gulch. Marked a tree at Ohiakiikii, and from thence surveyed down the road to flume. We then went down to where we came to the gulch and surveyed from there across to Honomu gulch. Then we to Palau's houses and surveyed to shore, and then across to the Honomu gulch. We went where Kauena pointed out.

Nawai k. Sworn

I went with Kauena and Kaiakoili when Ama surveyed the land. My knowledge is the same as the last witness has testified to. (Boundary Commission 1874a:283-284)

Following the testimony, the Commission heard the following statement from McCully. "...stated he finds that this land was sold to His Ex. C.C. Harris, paid cost, and declined to go any further in matter" (Boundary Commission 1874a:284)

On August 6th, 1886, the Commissioners of Boundaries convened again at the courthouse in Hilo on the application of D. H. Hitchcock, the attorney for Edward Witschy, to settle the boundaries of Mālamalamaiki 2. Sworn testimony for Mālamalamaiki 2 was provided by Kauhane, Bila Kamakana, and D. H. Hitchcock. Although no information concerning land use is noted in the testimony, information about traditional place names are mentioned. Their testimony is transcribed in its entirety below:

Kauhane sworn

Malamalamaiki first adjoins the land from the sea to "Kaloaawapuhi"; then Laimi joins, a road being the boundary; to "Kapoalua", where Honomu and Laimi meet, and Malamalamaiki 2nd ends. From Kapoalua down, the boundary of Malamalamiki 2nd and Honomu is an awawa [gulch] to the big gulch, which branches, the south branch being the boundary down to the sea; between Honomu and Malamalamaiki 2nd the north branch is large where it enters the woods, but it soon ends. "Kaili" is really the principal branch of the Honomu gulch, which runs a long way up into the woods—the stream of water in the gulch is the boundary between Honomu and Malamalamaiki 2nd to the sea; bounded makai by the sea.

Bila Kamakana sworn

Kauhane has told the boundaries correctly.

D. H. Hitchcock sworn

I surveyed the land of Malamalamaiki 2nd along the adjoining Royal Patents, as far as they go, and on along the boundaries as they were pointed out by Bila Kamakana; the land is very narrow above to the place called "Poalua." The survey of Malamalamaiki 2nd runs along the main branch of the Honomu gulch, which branches in the woods. (Boundary Commission 1874b:41-42)

A review of records obtained at the Olson Trust Archives indicate that C. C. Harris had purchased Mālamalamaiki 2, and that the land was later deeded to Edward Witschy. The land was then deeded to William Kinney, who according to the 6.5-Acre Holcomb Family Trust Parcel, Mālamalamaiki 1st and 2nd, South Hilo, Hawai'i

2. Background

to the 1890 *Directory and Handbook of the Kingdom of Hawaii* (Lane 1890), was the manager for the Honomū Sugar Company.

The Honomū Sugar Company mill itself was located on the coast, to the north of the current subject parcel and the upper region of Honomū was interspersed with small-farm homesteaders (Figure 20). By 1890 the plantation was producing 2,000 tons of sugar yearly. Initially, no Hilo coast plantation had a railroad, so fluming was extensively utilized by the Honomū Sugar Company who shipped its product from Honomū Landing to Honolulu via inter-island vessels that anchored offshore. A 1915 U.S.G.S. Honomū quadrangle of the subject parcel (Figure 21) depicts a portion of a flume traversing through the *makai* section of the subject parcel and descending into the Mālamalamaiki Gulch before continuing north along the coastline. Numerous flume routes can also be seen crossing the South Hilo landscape in Figure 21.

By 1919, the Honomū Sugar Company encompassed roughly 2,300 acres of land: 1,271 of which were owned outright by the company, and 1,000 of which were leasehold. The company's cultivated sugarcane lands extended from 50 to 1,500 feet above sea level, and were situated between the neighboring mills of Pepe'ekeo and Hakalau. A 1920 Hilo Forest reserve Plat Map No. 0799 (Figure 22) depicts the approximate extent of the Honomū sugar lands in relationship with the neighboring plantations. Water was diverted from several perennial streams including Pahaelae, Kolekole and Honomū (which bounds the subject parcel to the north) through a 9-mile long network of flumes to the fields which grew several varieties of cane including "... Yellow Caledonia with a little Rose Bamboo and a small amount of different varieties sent from the Planters' Experiment Station" and crop yields were further supplemented by nearby homestead growers who dedicated approximately 400 additional acres of land to cane cultivation for the company (Evening Bulletin Industrial Edition 1909). Figure 23, a 1932 Honomū Sugar Company Title Map, also shows the extent of the plantation's landholdings, which included fee simple (outlined in red) as well as leasehold lands (outlined in green). Uncontrolled lands (outlined yellow) are also indicated on the map. As depicted in Figure 23, the majority of the current project area was owned and operated as fee simple land by the Honomū Sugar Company, however a small portion of the project areas northwestern corner falls within uncontrolled lands. This section is likely associated with the Hawai'i Consolidated Railway company, and incorporates the Honomū/Malamalamaiki Gulch banks.



Figure 20. A 1929 aerial photograph of the Honomū Sugar Company Mill and surrounding area.

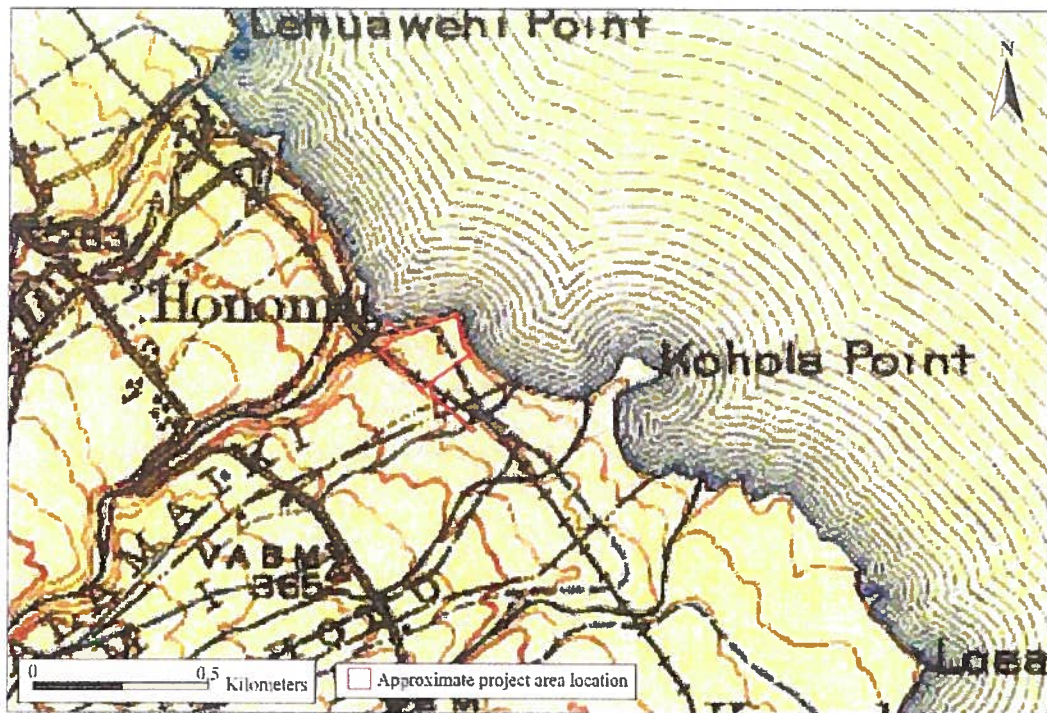


Figure 21. A portion of a 1915 U.S.G.S. Honomū Quadrangle showing the current subject parcel.

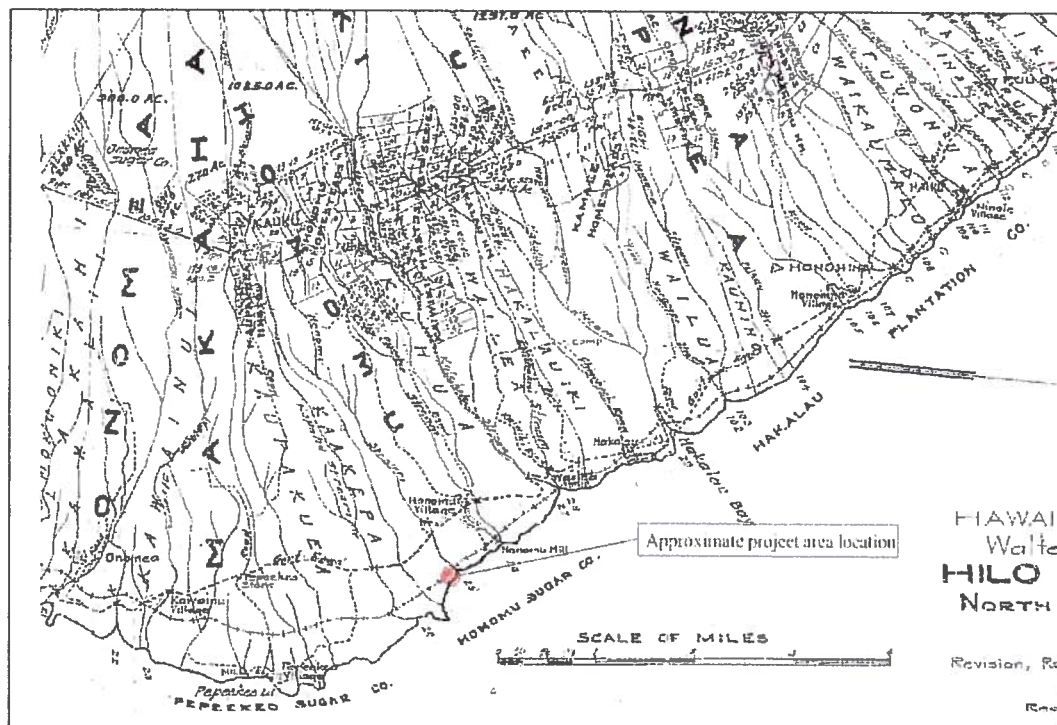


Figure 22. HTS/HSS Plat Map No. 0799 dated 1922 showing the extent of the Honomū Sugar Co. lands

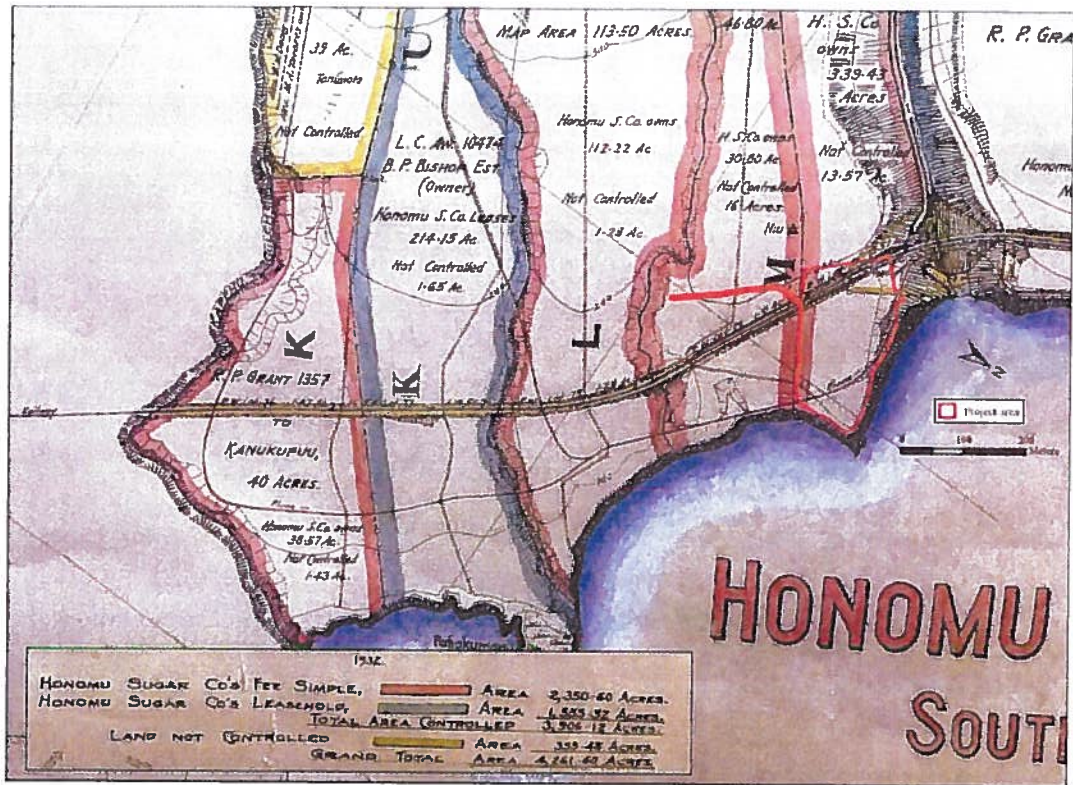


Figure 23. A portion of a 1932 Honomū Sugar Company Title Map with the approximate location of the current study area outlined in red.

An accompanying 1932 Field Map of the Honomū Sugar Company (Figure 24) indicates that the current subject parcel and the lands immediately surrounding it were incorporated as part of "Field 3" of the plantation. Field 3 extended *mauka* from the coastline to the old Māmalahoa Highway, totaled 44.8 acres, of which 37.45 acres were owned and operated by the plantation. As depicted in Figure 24, the level tableland within the project area was cultivated in "plantation cane" by the Honomū Sugar Company, whereas 1.25 acres of the project area was cultivated in "Pali Planters cane" (shaded orange). This included 0.70 acres of the parcel's rocky coastline (labeled #84), and 0.55 acres of the steep, Mālamalamaiki Gulch bank (labeled #82). The steep gulch banks and rocky coastal cliff edges in the South Hilo district made it difficult for the plantation companies' machinery to operate, therefore, independent contractors were hired to manually clear and cultivate cane in these marginal zones. The "Pali Planters" (gulch-side planters) were once such group contracted by the Honomū Sugar Company to clear and cultivate cane in these areas. By 1935, Pali Planters as well as other independent contractors, became "adherent planters" to the sugar cane companies under the Agricultural Adjustment Act (Lands 1948). Also depicted in Figure 23 is the Hawai'i Consolidated Railway route, as well as a permanent flume (labeled "flume") extending through the *makai* portion of the subject parcel before crossing the Mālamalamaiki Gulch.

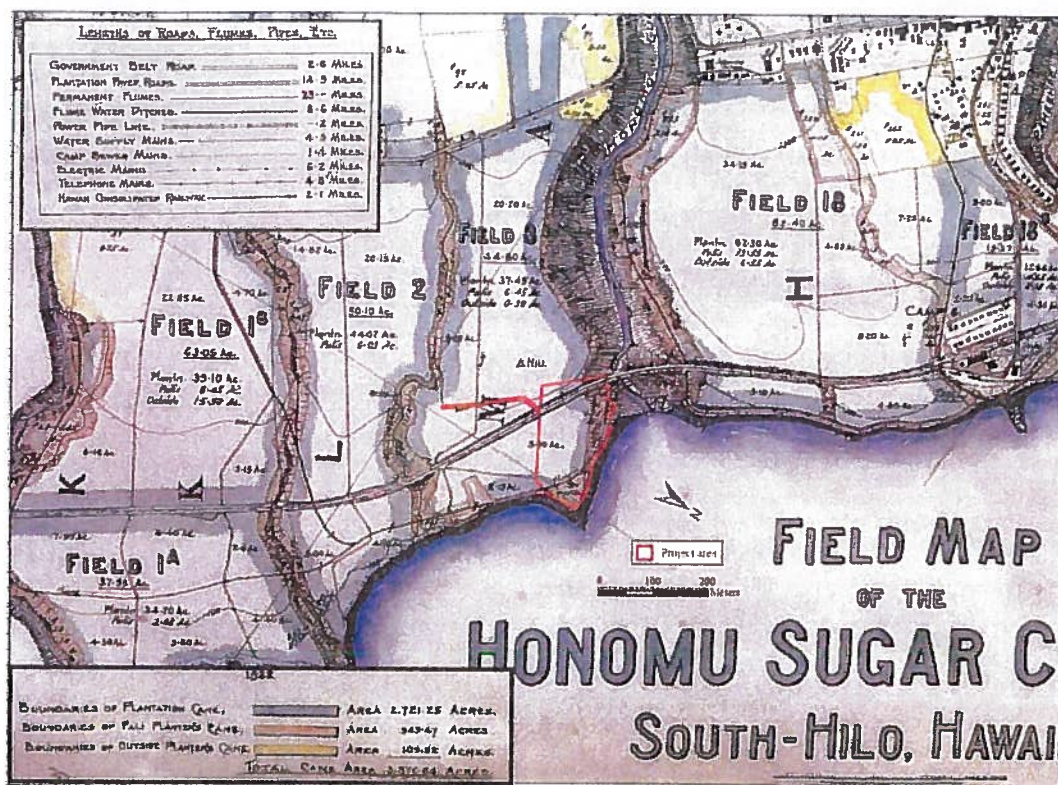


Figure 24. A portion of a 1932 Honoumū Sugar Company Field Map with the approximate location of the current study area outlined in red.

By 1941, Honoumū Sugar Company held 3,027 acres of cane land, and production had reached 10,407 tons (Hitch 1992), but in years following World War II left an indelible mark on the company as it fell under duress due to wage increases and labor scarcity. A pattern of cane field acquisition emerged in the following years in an effort to boost cultivatable acreage and thereby ensure sustainable profitability for the big players in the industry, and in 1946, C. Brewer & Co. acquired controlling interest in Honoumū Sugar Company and merged it into the Pepe'ekeo Sugar Company (Dorrance and Morgan 2000). Nearly two decades later in 1962, Pepe'ekeo Sugar Company fused with Hakalau Plantation, and in 1973 Hakalau consolidated into Mauna Kea Sugar Company, a non-profit corporation that now held Hakalau in addition to the Honoumū, Pepe'ekeo, Onomea, and Hilo Sugar companies (ibid.). Mauna Kea Sugar Company, which eventually became Mauna Kea Agribusiness, became the third largest in acreage (13,000 acres) on Hawai'i Island. It continued to operate until 1994 when it phased out sugar production and closed its doors forever, marking the end of commercial sugarcane production in the Hilo area (ibid.). The rise and fall of the sugar industry were closely intertwined with the development of rail transportation in the district.

Hawai'i Consolidated Railroad Company 1901-1946

Railroad construction was one of the most important elements of governmental and private sector planning following the Treaty of Reciprocity, as crops and product were still being transported by beast and cart (Dorrance and Morgan 2000). On the Island of Hawai'i, the first major line to be constructed was in North Kohala District, which operated as the Hawaiian Railroad Company. The North Kohala line, however, was envisioned as only the first step toward a much larger system connecting the cane fields of Kohala, Hāmākua, and Hilo with Hilo Harbor, the only protected deep-water port on the island. Beginning in 1899, railroad lines began transporting sugar to the harbor for marine transport, thus Hilo became an important shipping and railroad hub.

Lorin A. Thurston, who according to Thrum had "been connected with the enterprise from its initiation" (Thurston 1913), wrote an article upon the completion of the railroad from Hilo to Pa'auilo, Hāmākua in May of 1913 entitled "Railroading in Hilo" which was published in *Thrum's Hawaiian Annual and Almanac for 1914*. Thurston reported that the Hilo Railroad Company (HRC) initiated the railroad endeavor in 1899 from Waiākea south to 'Ōla'a and onwards to Kapoho. The initial distance of twenty-five miles of track was completed by April 1901. Later that same year, the track was extended along the waterfront of Hilo to the Wailuku River, at the foot of Waiānuenue Street"

(ibid.:143). In 1903, HRC constructed a wharf at Waiākea and completed a branch line connecting it to the waterfront line.

The commercial sugar industry provided most of the cargo transported by HRC, but suffered a sharp decline between the years of 1904-1907, which caused a halt of development in Hilo (Thurston 1913). In response, HRC worked with 'Ōla'a Sugar Company to send a representative to Washington D.C. in 1907 to secure funding for the construction of a breakwater that would allow Hilo Bay to accommodate larger ocean-going vessels. Construction on the breakwater began in 1908 and was still ongoing at the time of Thurston's writing (ca. 1914): the breakwater was finally completed in 1929. In exchange for construction of a breakwater in Hilo Bay, the Hilo Railroad was required to build a new wharf, a one-mile rail extension from Waiākea, and a 50-mile rail extension north to Honoka'a Mill (the Hāmākua Division). The funding of the breakwater by HRC resulted in the extension of the railroad through the populated section north of Hilo all the way to Hakalau and Hāmākua (Figure 25):

When the breakwater project was pending before Congress, opposition was made to the appropriation on account of the limited commerce then being transacted through Hilo harbor.

Assurances were thereupon made by the Hilo Railroad Company, that if the breakwater were constructed, a railroad would be built into the country north of Hilo and suitable wharf facilities provided under the lee of the breakwater. Such assurances had a material effect in securing the appropriation. (ibid.:145)

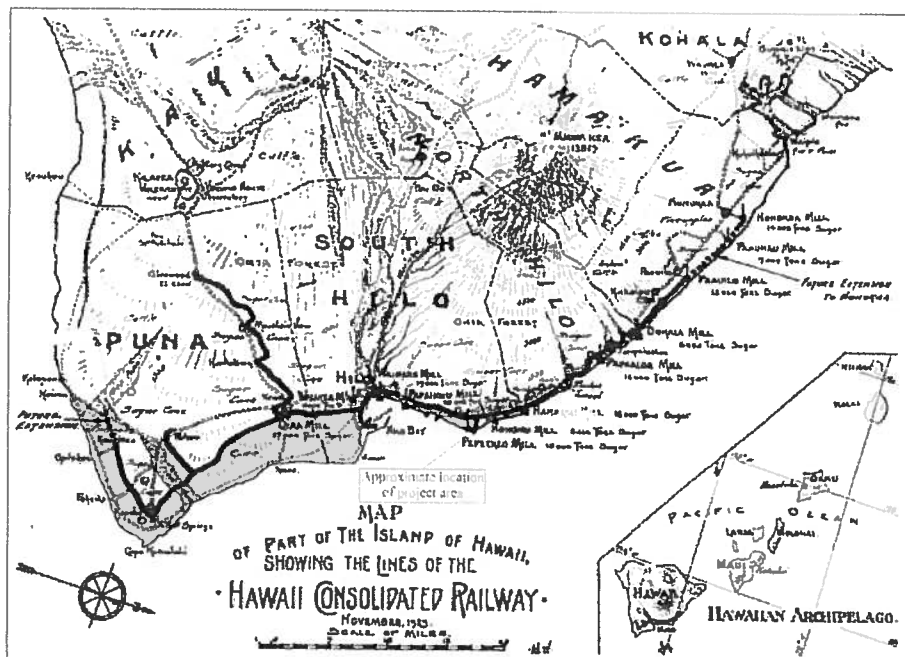


Figure 25. Hawaii Consolidated Railway Map of rail system as of November 1923 (Annual Report 1926).

The extension to Honoka'a would finally connect the sugar mills of South Hilo, North Hilo, and Hāmākua with Hilo's protected harbor. Between June 1909 and December 24, 1911, HRC built 12.7 miles of rail extending from Hilo to Hakalau Mill, crossing many deep gulches and valleys, including the current study area, along its route. This was followed by the construction of an additional 21 miles of rail that connected Hakalau with Pa'aui to the north, which covered a total distance from Hilo of roughly 34 miles and was known as the "Hāmākua Division" (ibid.:146). The railroad can be seen crossing through western portion of the subject parcel as early as 1915 (see Figure 21). Thurston defined the objective of the Hāmākua Division thusly:

The principal object of the extension is to give adequate transportation facilities between Hilo and the fertile and well-settled territory extending for 50 miles north of the town of Hilo, and averaging three to four miles in width. This district produces nearly one-fourth of the entire output of sugar of the Territory and is, including the town, the home of over 30,000 people. The only means of access to this section has heretofore been by wagon road, almost impassable in rainy weather, and by derrick and cable landings over bluffs rising from 50 to 300 feet sheer from blue ocean. There are no harbors. (ibid.:147)

Thurston described the scenery afforded to passengers who traveled on the Hāmākua Division as follows:

Incidentally, the road has opened up one of the most remarkable, unique and spectacular scenic routes to be found in any part of the world. It may appear impossible for a railroad to run through a thickly-settled, highly-cultivated country and yet be noted for spectacular scenery. The paradox is explained by the fact that the district lies along the base and on the steep slope of Mauna Kea, the highest mountain in the Pacific. . .

The combination of steep grade and heavy rainfall has resulted in excessive erosion, the mountain side being seamed at frequent intervals with deep gulches, in which the streams form innumerable cataracts and waterfalls. . .

Some conception of the rugged character of the country can be gained from the fact that in less than 34 miles, there are 211 water openings under the railroad track, ranging from a concrete culvert to steel bridges up to 1006 feet in length and 230 feet high. . . (ibid.147-149)

The environs of the current study area were described by John W. Bains in an article entitled "Around About Hilo" that was published in a January 1913 edition of the *Mid-Pacific Magazine*:

Mile upon mile of sugarcane fields stretch away on both sides of the line, insistent evidence of the magnitude of Hawaii's most valued product. The quaint and unique method of conveying the cane from the uttermost borders of the fields to the very jaws of the mill rollers by the means of water flumes is to be seen at various points along the line. (Bains 1913:356-357)

Ultimately, the cost of the Hāmākua Division ruined HRC and as a result, they were forced to sell out and reorganize under the name Hawaii Consolidated Railway (HCR) in 1916. In 1920, HCR attempted to capture a larger piece of the growing tourist business with its adventurous scenic route tour dubbed the "Scenic Express." HCR had long offered service to Glenwood for tourists visiting Kilauea, but motorbuses now dominated this route. The Hāmākua Coast, by contrast, was not easily accessible by automobile. HCR was therefore able to run passenger coaches profitably along the Hāmākua Division with stops at scenic points. Passenger business declined precipitously in the early decades of the twentieth century, and the rise of the automobile was a harbinger for the railroad. In 1920, 607,220 passengers were carried. In 1930, the number dropped to just 77,894 and continued as the years progressed, with passenger counts dropping as low as 16,681 in 1936 (Best 1978:145-146). As a result, the remaining passenger cars were converted for other uses, and the little passenger traffic which persisted was hauled on custom-built railbuses.

In the years following railway passenger-ship progressively dropped, but with the onset of World War II usage spiked significantly due to war-time gas rationing and the dramatic influx of servicemen. By 1943 passenger totals had rebounded profoundly to 103,635 but inevitably, the popularity of automobiles began to take a toll on the railroad's industrial customers. As roadways were improved and gasoline prices dropped, simple economics favored trucking over trains. Ironically, just as rail transportation was in the throes of decline, HCR was by 1945 almost out of debt for the first time since its inception. The great *tsunami* of 1946, however, would soon seal its fate.

The *Tsunami* of April 1, 1946

On April 1, 1946, a *tsunami* triggered by an earthquake in the Aleutian Islands slammed into the north facing shores of Hawai'i Island, dealing a fatal blow to the already struggling HCR. Tracks around the waterfront were entirely washed out and the Hilo Station was wrecked. An entire span of the Wailuku Bridge was torn out and washed out river and "twelve miles north of Hilo, the railroad bridge at the mouth of the Kolekole Stream lost its center span" from a massive inundation of water that reached heights of 37 feet in Kolekole and neighboring Hakalau Gulch (Klein et al. 1985; MKE and Fung 2013:E8).

With the Hamakua Division officially defunct, Hawaii Consolidated Railway offered its right-of-way, bridges, and tunnels to the territorial division of highways and Hawai'i County supervisors. In a bold act of short-sightedness, both agencies refused. Un-phased, Hawaii Consolidated liquidated its assets on December 26, 1946. The entire railroad was sold to Gilmore Steel & Supply Co. of San Francisco for a mere \$81,000. Most of the bridges were dismantled and the rails were pulled up along the length of the Hāmākua Division. Together with the remaining rolling stock, they were shipped to California as scrap metal. In the midst of the disassembly, the Division of Highways belatedly decided that Route 19 needed to be relocated and improved. It purchased the remaining bridges, plus some that were awaiting shipment in Hilo, for \$302,723.53. Steel from the dismantled railroad bridges was used to widen the standing bridges for their new roles as highways. In Hilo, the damaged docks and track were repaired and rail service was continued to Olaa Sugar under lease from Gilmore Steel & Supply Co. Product was transported by train from Olaa

2. Background

Sugar until December of 1948, at which time the line was permanently closed. All remaining assets were sold to The Independent Ironworks of Oakland for scrap.

Following the April 1, 1946 *tsunami*, the sugar industry persisted in the South Hilo District until 1994. The railroad bridges from Hilo to Hākalau that were destroyed by the 1946 *tsunami*, were rebuilt and reopened for vehicular travel along the Hawai'i Belt Road in 1950 (which replaced the old Mamālahoa Highway), and remains in use to this day. A 1954 U.S.G.S. aerial image of the project area (Figure 26) which depicts the majority of the parcel cultivated in sugar cane, shows both the newly created Hawai'i Belt Road (the Māmālahoa Highway) as well as the former route of the Hawai'i Consolidated Railroad (Site 24212) along the western boundary of the subject parcel. A portion of a former flume route (seen as a large cut in the terrain) is also shown crossing through the *makai* portion of the parcel, before descending down into the gulch. This cut is no longer visible in a 1977 U.S.G.S. aerial image of the property (Figure 27), however the parcel is still shown to be cultivated in sugar cane at this time. Also depicted in Figure 25 is a loop road, a portion of which extends into the project area.

The dismantling of the railroad in 1946-1947 led to the development of additional plantation roads. The loop road that can be seen in the 1977 aerial image of the parcel is a portion of one such road. This road, which is also visible on a 1966 U.S.G.S. Papaikou quadrangle (Figure 28), was likely originally constructed as a cane haul road to provide vehicular access the Honomū plantations surrounding cane fields. The current easement that provides access to the project area as well as the neighboring parcel to the south follows this roads trajectory.

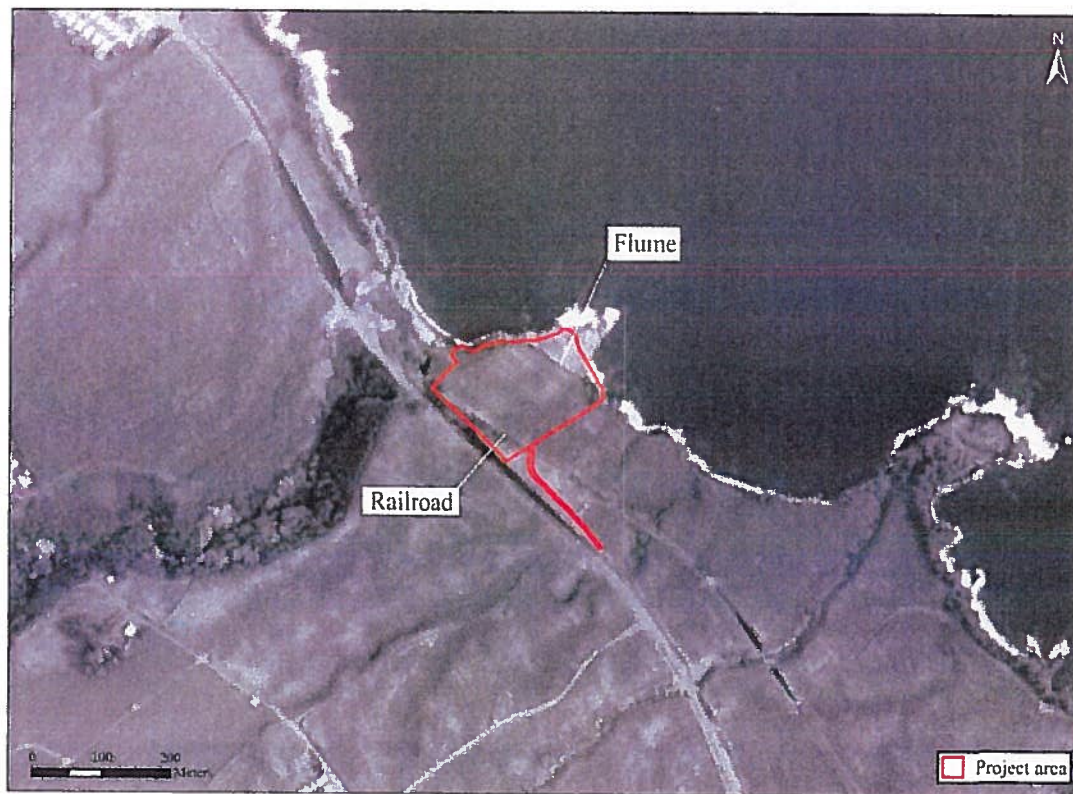


Figure 26. A 1954 U.S.G.S. aerial image with the approximate location of the current study area outlined in red.

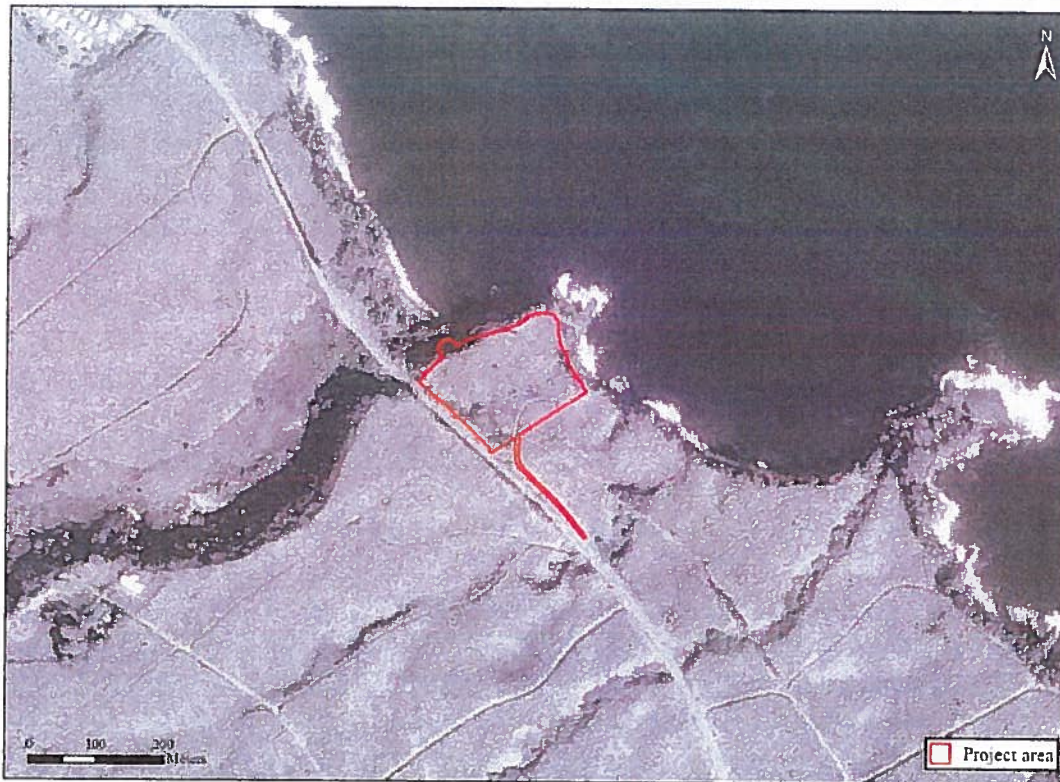


Figure 27. A 1977 U.S.G.S. aerial image with the approximate location of the current study area outlined in red.

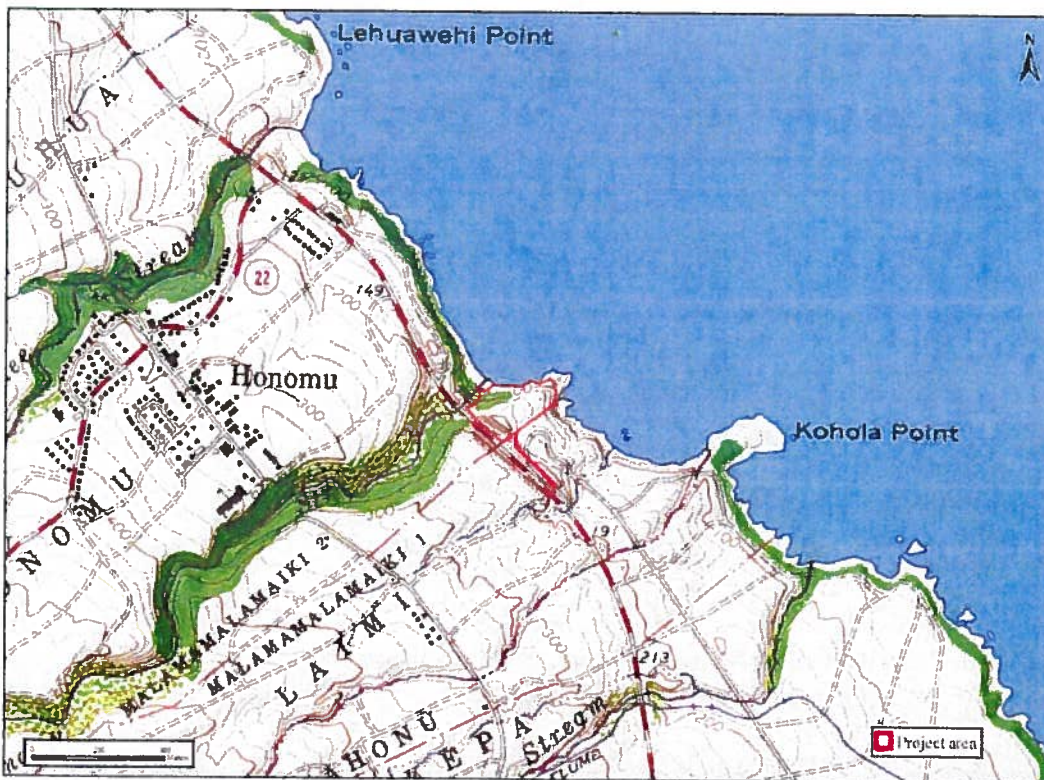


Figure 28. A portion of a 1966 U.S.G.S. Papaikou Quadrangle with the approximate location of the current study area outlined in red.

PREVIOUS ARCHAEOLOGICAL STUDIES

A search of archaeological reports on file at the DLNR-SHPD revealed that there have been no previous archaeological studies conducted specifically within the subject parcel. However, several previous studies have been conducted in the vicinity of the study area at similar elevations in the neighboring *ahupua'a* within the South Hilo district. These studies have included the lands of Hakalau Nui, Hakalau Iki, Wailea, Kaiwiki 3, and Kuhua. The most relevant of these studies are discussed below and presented in Table 2 and Figure 29.

Among the earliest archaeological work to be done in East Hawai'i was that of the early twentieth century *heiau* researchers Thrum and Stokes (Stokes and Dye 1991; Thrum 1908). No *heiau* were identified in the current study area or within the larger region spanning between Honomū and Hakalau. During the early 1930s, A.E. Hudson (Hudson 1932), working under the aegis of the Bernice Pauahi Bishop Museum, also conducted archaeological investigations in East Hawai'i. He found little in the region surrounding the current area of study, although he did note the presence of a roughly .25-mile square area of *kalo* terraces north of the study area in the upper part of Hakalau Gulch (Hudson in Maly 1994).

Walker and Rosendahl (Walker and Rosendahl 1994a, 1994b) conducted an AIS of approximately 595 acres of land within TMKs: (3) 2-9-002 and 004 located north of the current study area within Hakalau Nui *Ahupua'a* (see Figure 29). The study area was situated between the Hawai'i Belt Road and the 1,500-foot elevation mark on the northern side of Hakalau Gulch. An initial, low-level aerial (helicopter) survey was conducted over some of the uncultivated portions of the study area. Other uncultivated areas were investigated using "variable-coverage (partial to 100%) variable-intensity ground survey" (Walker and Rosendahl 1994b:2). As a result of the survey, it was evident that the study area had been extensively modified during Historic times for commercial sugar cultivation. As a result of this, no archaeological sites were identified.

In 1998, an archaeological survey was undertaken in support of an Environmental Assessment (EA) for the seismic retrofitting of Kolekole Bridge by Cultural Surveys Hawai'i, Inc. (Hammatt and Colin 1998) (see Figure 29). The survey area included "the slopes of Kolekole Gulch under and surrounding the Kolekole Bridge and approximately 100.0 feet of the slopes *mauka* and *makai* of the bridge" as well as "any access route to the gulch or other areas which would be used during construction of the bridge improvements" (Hammatt and Colin 1998:i and 1). As a result of that study, square footings from the pre-1946 Kolekole Bridge were noted outside the study area and a cylindrical cement footing was observed in the middle of Kolekole Stream. No other cultural remains were observed.

In 2001, (PHRI) (Rosendahl 2001a, 2001b) conducted a study of two former Historic cemeteries located within TMKs: (3) 2-9-002:001 (por.) and :083 (por.) (identified as Lots 5 and 10 of the Hakalau Estates Subdivision, respectively), both of which are located to the northwest of the current study area along the coastal bluffs (see Figure 29). With respect to Lot 5, Rosendahl (2001a) sought to determine the status of the cemetery and identify potential impacts that would be caused by the sale of the property. As a result of the study, the cemetery was identified as an informal, plantation-era cemetery associated with the Hakalau Jodo Mission (locally referred to as the "Japanese Cemetery"). The cemetery was primarily utilized during the first third of the twentieth century and may have held approximately 200 individuals. All of the graves were disinterred with a backhoe in the early 1970s by Homelani Memorial Park staff and were reinterred in that cemetery. Most of the individual internments consisted of deteriorated wooden coffins and skeletal remains. The grave monuments were generally reburied in the excavated pits after the remains were removed.

The study for Lot 10 was conducted in two stages; preliminary research and subsequent field inspection. The purpose of the study conducted by Rosendahl (2001b) was to confirm the boundaries of what is referred to as the "Catholic Cemetery." The initial research conducted for the study included oral history consultation with local informants familiar with the area. As a result of the study, Rosendahl (2001b) concluded that the cemetery was an informal plantation-era cemetery with an overall total area estimated between 1 to 2 acres and held possibly 200 to as much as 250 internments of individuals of several ethnicities (Filipino, Portuguese, Puerto Rican), all of whom were likely mainly plantation employees and/or family members of the Catholic faith. They found that the cemetery was primarily utilized during the first half of the twentieth century, and, while a few of the graves were disinterred in the late 1970s by individual families; most of the graves remain in their original place. Some of the graves within the cemetery probably date to the end of the nineteenth century or early twentieth century.

Rechtman Consulting, LLC (Desilets et al. 2004) conducted an AIS and limited cultural assessment of three land parcels comprising 4.5 acres (TMK: (3) 2-9-003, 013, 029, and 060) to the north of the current study area in Wailea *Ahupua'a* (see Figure 29). A systematic survey of the study area (TMKs: (3) 2-9-003:013, 029, 060) produced no evidence of traditional Hawaiian remains or evidence that the area was currently being accessed for the exercise of traditional and/or customary practices. A single Historic era site (Site 24212) with two associated features (Features

1 and 2) was recorded as a result of the study. This site consisted of two features situated in the northwestern portion of the study area that were interpreted as being associated with the Hāmākua Division of Hilo Railroad-Hawaii Consolidated Railway. Feature 1 consisted of a possible 10 to 15-meter long and 4-meter wide section of the former Hawai'i Consolidated Railway railroad grade section of railroad grade. Feature 2 consisted of a railroad trestle abutment that formerly crossed Kaahakini Gulch. Site 24212 was actively utilized by the railroad between 1911 to 1946, and primarily served to facilitate the transport of raw sugar from the many mills along the Hilo and Hāmākua Coasts to the harbor at Hilo Bay. In later years, they also served the secondary function of facilitating tourism.

PHRI (Rosendahl 2009) conducted an AIS and Cultural Impact Assessment (CIA) for an 8.7-acre property in Hakalau (TMKs: (3) 2-9-002:079 and 081) situated along the coastal bluffs to the north of the current study area (see Figure 29). The purpose of the study was to determine the general nature, extent, and potential significance of any archaeological-historical remains present, the historic preservation implications of any such remains for the feasibility of proposed residential development, and the general scope of work and level of effort for any subsequent archaeological-historic preservation work that might be needed. As a result of the fieldwork, two archaeological sites were identified: Site 26591, which consists of two warehouses (Features A and B) and associated foundation remnants (Features C thru I); and Site 26592, the site of the former Japanese/Korean cemetery (previously documented by PHRI (2001) but never assigned an SIHP number). Site 26591 was assessed as significant under Criteria a, c, and d, and Site 26592 was assessed for significance under Criteria d and e. With respect to Site 26591 Features A and B, Rosendahl (2009) recommended preservation with interpretive development and suggested renovation, and data recovery was the recommended treatment for Site 26592.

In 2011, Scientific Consultant Services, Inc. (Escott 2011) conducted an archaeological assessment (AA) of a 3.5-acre parcel in the *ahupua'a* of Kaiwiki 3, north of the current study area along the northern bank of Kolekole Stream (see Figure 29). No archaeological resources were identified as a result of the study.

Haun and Henry (2014) conducted an AIS of a 2.332-acre parcel (TMK: (3) 2-9-002:083) within the *ahupua'a* of Hakalau Nui to the north of the current study area (see Figure 29). A portion of this parcel was also investigated by Rosendahl (2001). As a result of the study, Haun and Henry (2014) identified the remnants of a plantation hospital (Site 30085), a concrete culvert that extended over a ditch (Site 30086) and the former location of the Japanese cemetery (Site 30087) previously documented during the Rosendahl (2001) study that existed within the project area prior to reinterment. Preservation was the recommended treatment for the cemetery location (Site 30087) and no further work was recommended for Sites 30085 and 30086.

In 2019, ASM Affiliates conducted an Archaeological Assessment of a 5.497-acre parcel (TMK: (3) 2-8-015:015) for improvements to the County of Hawai'i's Kolekole Gulch Park in Kuhua Ahupua'a, north of the current project area (Glennon et al. 2019). No archaeological resources were identified within Kolekole Park as a result of the study. Glennon et al (2019) determined that although the park was established in 1938, and has been an important recreation area for this portion of the South Hilo coastline, the existing structures bear no known direct association to ongoing cultural practices, traditional beliefs, events, or oral history of native Hawaiians or other ethnic groups. As such, the existing pavilions were not considered significant under any of the Hawai'i Register of Historic Places (HRHP) significance criteria, and therefore no SIHP Site numbers were assigned to them. subsurface archaeological resources are unlikely to be encountered in the areas proposed for park rehabilitation

Table 2. Previous archaeological studies conducted in the vicinity of the current study area.

<i>Year</i>	<i>Author(s)</i>	<i>Type of Study</i>	<i>Ahupua'a</i>
1994a	Walker and Rosendahl	AIS	Hakalau Nui
1994b	Walker and Rosendahl	AIS	Hakalau Nui
1998	Hammatt and Colin	Archaeological Survey	Kahua
2001	Rosendahl	AIS	
2004	Desilets	AIS	Wailea
2009	Rosendahl	AIS and CIA	Hakalau
2011	Escott	AA	Kaiwiki 3
2014	Haun and Henry	AIS	Hakalau Nui
2019	Glennon et. al.	AA	Kahua

2. Background

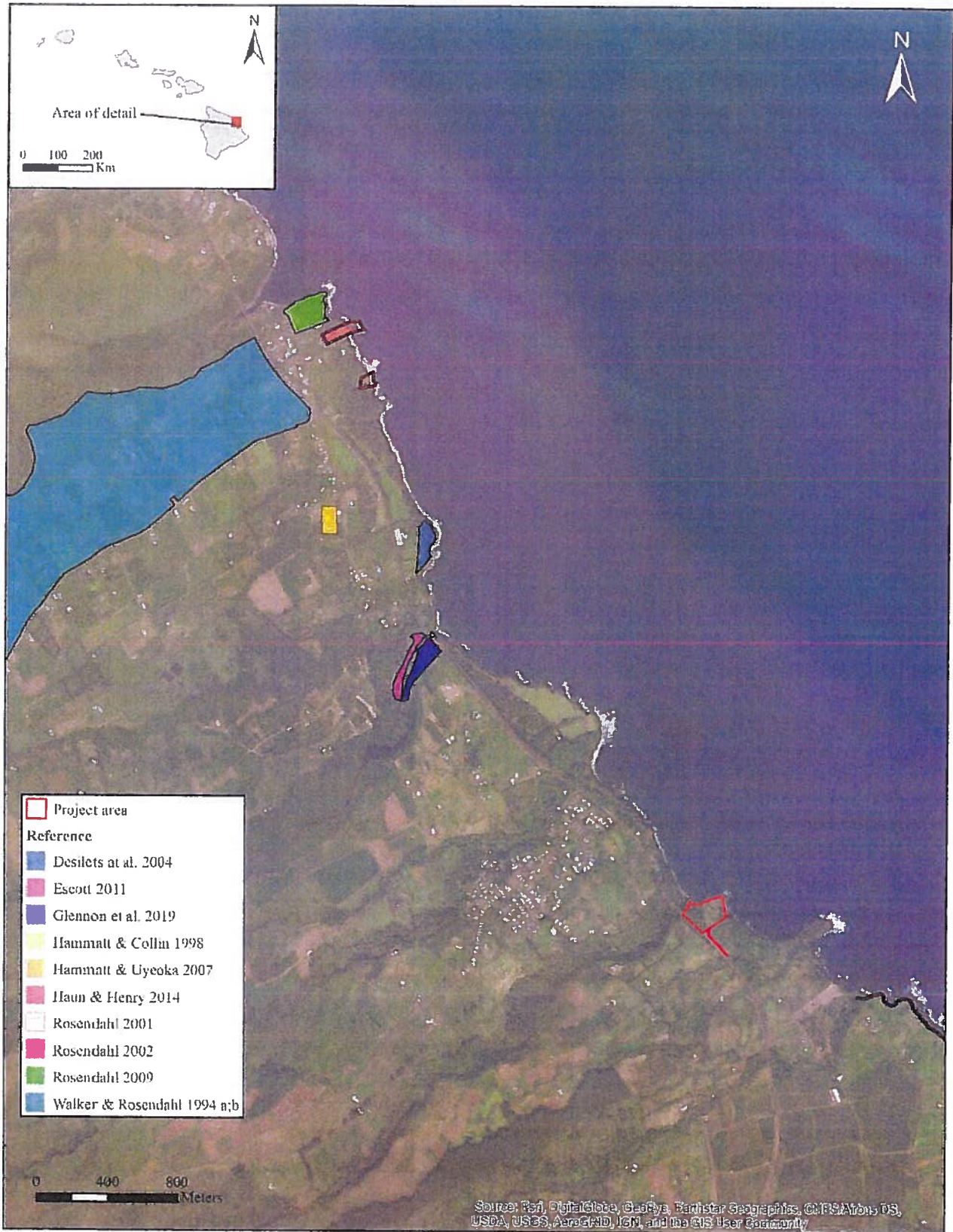


Figure 29. Previous archaeological studies in the vicinity of the current study area.

3. STUDY AREA EXPECTATIONS

Based on a review of the previous archaeological research, historical documentary research, and settlement patterns for the coastal South Hilo District, a set of archaeological expectations for the current project area are presented. Historical data indicate that the general area was part of the heavily exploited traditional Hawaiian *kula* lands. For the last 100 years, however, the area has been utilized for sugarcane cultivation and associated transportation. It is likely that these Historic era modifications have largely destroyed any traditional Hawaiian features that may have been present in the project area. The extreme coastal fringe along the eastern boundary of the parcel, as well as the edges of the Mālamalamiki Gulch/ Honomū Stream Gulch along the northern boundary of the property may have been less affected by these disturbances. The northern gulch edge, however, is very steep-sided and descends directly to a rocky streambed and a small rocky beach. The terrain in this area is not a well-suited place for traditional Hawaiian cultivation or habitation. The small rocky beach located at the base of the gulch (outside of the project area), however, would have been an opportunistic area for fishing and gathering of marine resources.

Based on historic maps depicting the current study parcel, it is expected that remnants of the Hawai'i Consolidated Railroad bed (Site 24212) will be found along the project area's western boundary. These maps also depict a flume crossing the parcel, leading into the gulch. Remnants of this flume are also expected to be found along the gulch edge and possibly within the central portion of the project area. Other remnants of Historic sugarcane infrastructure may also be found within the property. These remains may be concentrated in the central portions of the project area, or near the former flume route and railroad bed. Traditional Hawaiian agricultural and habitation features are unlikely to have survived historic disturbance from sugarcane cultivation. If present, they may include stone-constructed mounds, terraces, agriculture related features, or walls. These would likely be found in the vicinity of the lesser-impacted southern and eastern boundaries of the project area.

4. FIELDWORK

Fieldwork for the current study was conducted on August 13th and 24th, 2020, by Jonny Dudoit, B.A., Genevieve Glennon, B.A., Gabriela Edwards, B.A., and Tim Scheffler Ph.D., under the direct supervision of Matthew R. Clark, M.A. (Principal Investigator). A total of 28 labor hours were expended to complete the inventory survey fieldwork.

FIELD METHODS

Fieldwork consisted of an intensive (100% coverage) pedestrian survey of the entire project area. The survey crew walked systematic northwest-southeast (cross-slope) transects across the entire project area with fieldworkers spaced no more than 10 meters apart. The rocky coastal cliff as well as the steep edge of the Mālamalamaiki Gulch were subject to a particularly thorough investigation, as these areas were less likely to have been impacted by activities associated with sugarcane cultivation. While the vegetation cover was thick throughout most of the project area, for the most part ground visibility was suitable for identifying any cultural features that may have been present.

Upon completion of the pedestrian survey, the survey crew returned to each potential feature to clear vegetation and examine them more thoroughly. Those features determined to be historic properties were then photographed (both with and without a meter stick for scale), and described using standardized feature record forms. Each feature was assigned a temporary site number sequentially as it was recorded (T-1, T-2, T-3, etc.), and a more precise location for each of the recorded features was collected using a handheld tablet computer running ESRI's Collector application connected to an EOS Arrow 100 GNSS receiver with sub-meter accuracy (set to the UTM NAD 83 datum, Zone 5 North). Site boundaries were defined based upon the spatial arrangement the recorded features and the inferred associations between them. No subsurface testing was conducted during the inventory survey fieldwork as the only identified sites clearly date from the middle to late nineteenth century.

FINDINGS

As a result of the fieldwork for the current study, a portion of one previously recorded site (Site 50-10-26- 24212) and one newly recorded site (Site 50-10-26-31238) were identified and documented. (Table 3). Site 24212 consists of the Hilo Railroad-Hawai'i Consolidated Railway bed, a portion of which extends near to the western boundary of the parcel. Site 31238 is the former route of a Historic permanent flume associated with the Honomū Sugar Company, which extends east to west near the northern boundary of the project area. The locations of these sites relative to the parcel boundary are presented in Figure 30. The sites are described in further detail below.

Table 3. Archaeological sites recorded during the current study.

<i>SIHP Site Number</i>	<i>Type</i>	<i>Function</i>	<i>Age</i>
50-10-26-24212	Railroad bed	Transportation	1901-1946
50-10-26-31238	Flume	Agricultural	1890's

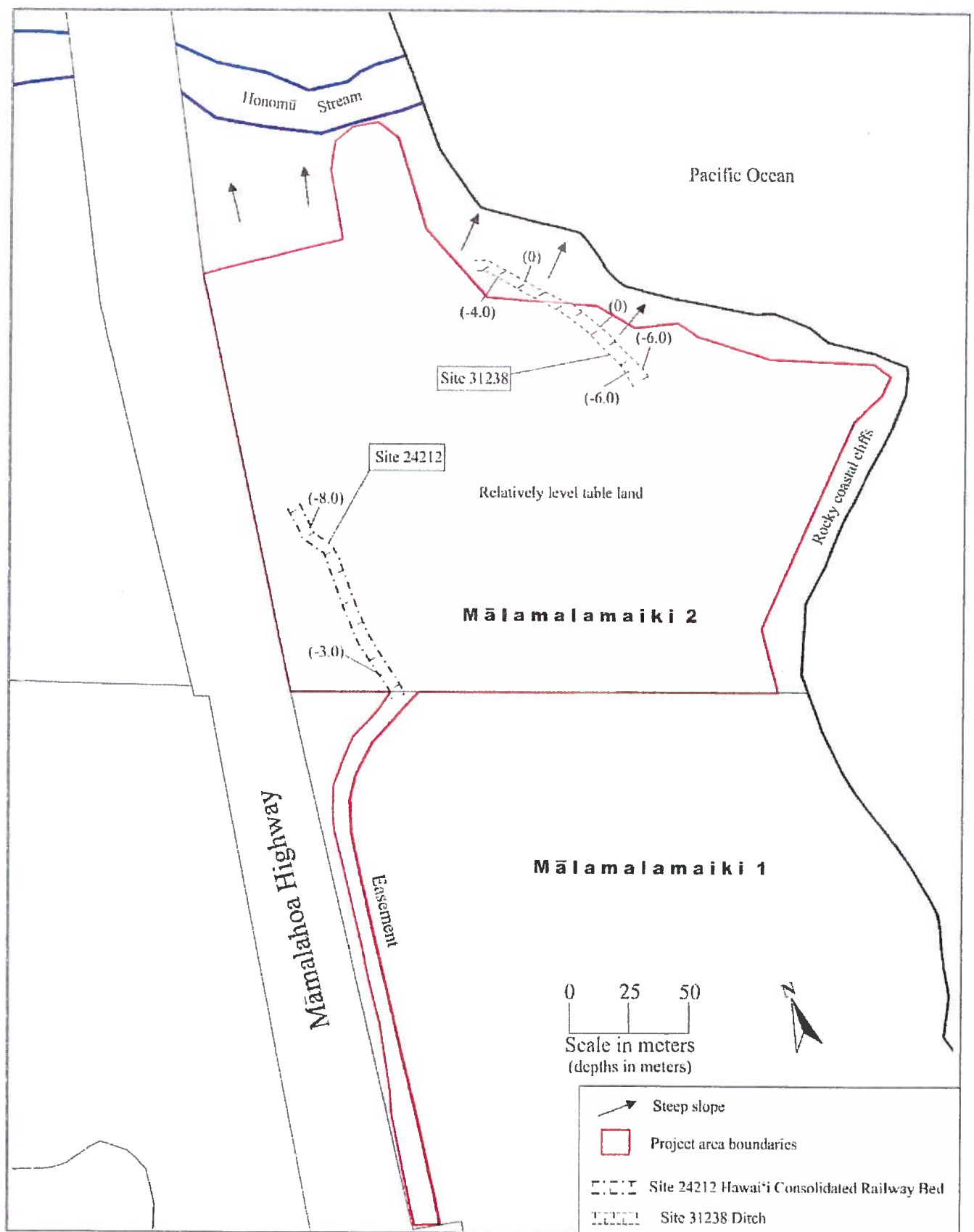


Figure 30. Site location map.

Site 50-10-26-24212

Site 24212 consists of an approximately 82-meter-long section of the Hāmākua Division of the Hilo Railroad-Hawai'i Consolidated Railway bed, which extends northwest to southeast through the current project area, near to the parcels western boundary, and roughly paralleling the Māmalahoa Highway. (see Figure 30). The railway was previously recorded to the north of the study area by (Desilets et al. 2004). The portion of Site 24212 within the project area is defined by a relatively deep, mechanically made cut excavated below the natural ground surface (Figure 31). The steep cut slopes, consisting of soil and rock, vary in depth from 3-8 meters, increasing in depth as the railbed approaches the Highway at its northwestern end. The average width of the cut (the bed of the railroad) measures 5 meters (Figure 32). The surface of the railbed is fairly level and consists of soil and some loose cobbles. No rails, ties or other railroad infrastructure were observed within the cut railroad corridor.

The Hawai'i Consolidated Railway's Hakalau Extension that linked Hilo with the Hakalau Mill began construction in 1908 and was finished in 1911. Historic maps as well as aerial images of the parcel depicts the railroad right-of-way crossing the western portion of the project area (see Figures 21, 22, 23, 24, 26, 27, and 28). Given the historical information known about the Hāmākua Division, the portion of the Site 24212 that crosses the project area was likely built sometime during the early nineteenth century, and the materials that were once used as part of the railroads infrastructure (e.g. railroad ties and rails) were disassembled and sold following the 1946 *tsunami*, and the creation of the Māmalahoa Highway in 1950. The southern end of railroad bed within the project area is filled in by soil and rock. This likely occurred during the construction of a cane haul road (the current easement for the subject parcel) sometime during the early 1960s. Overall, the railroad bed is heavily eroded and in poor condition, and the portion of the railroad bed that crosses the current study area essentially retains its integrity of location but little else. Soil from the cut slopes has deposited onto its surface altering its shape (Figure 33), and heavy vegetative growth including a grove of Alexander palms within the cut, has also impacted the site. This site is assessed as significant under Criteria a and d (see discussion below).



Figure 31. Site 24212 Hawai'i Consolidated Railway bed cut, view to the southeast.



Figure 32. Site 24212, railway bed, view to the northwest.



Figure 33. Site 24212, eroded western slope of railway bed, view to the west.

Site 50-10-26-31238

Site 31238 consists of a section of a cut earthen ditch situated along the southeastern edge of Mālamalamaiki Gulch near the northern boundary of the project area (see Figure 30). This site is the former location of a permanent flume built by the Honomū Sugar Company. A roughly 41-meter long portion of the ditch is located within the project area. This section of Site 31238 consists of a V-shaped cut that extends west from the edge of a former sugarcane field down the steeply sloped edge of Mālamalamaiki Gulch. The cut ranges from 3 meters wide at the base to 6 meters wide at the top, and is between 4 and 6 meters deep. The walls of the cut are formed of soil and bedrock. The ditch maintains a moderate grade along the steep contours of Mālamalamaiki Gulch as it slopes downward to the west before exiting the northern boundary of the project area and continuing downslope into the gulch (Figure 34). The western end of Site 31238, beyond the boundary of the project area, has eroded from the edge of the cliff face and is no longer present (Figure 35). No evidence of the former flume route, which was likely formed of metal, concrete, and wood sections laid on the ground surface, was observed to the east of the Site 31238 cut within the project area. The cut was required to maintain the grade and flow of water through the flume as it carried sugarcane from the fields, within and to the east of the project area, west across Mālamalamaiki Gulch to Honomū Mill.

Based on historical information, Site 31238 was likely constructed sometime during the late 1890s, before the advent of the railroad, as part of an extensive network of flumes the Honomū Sugar Company employed for diverting water and transporting cane. The alignment of the Site 31238 flume appears on maps as early as 1915. It is shown on the 1915 U.S.G.S. Honomū quadrangle extending northwest across the *makai* portion of the project area before turning west (at the location of the cut), crossing Mālamalamaiki Gulch, and continuing to the Honomū Sugar Mill (Figure 21). Later Honomū Sugar Company title and field maps prepared in 1932 (Figures 23 and 24) indicate that the flume originated at Kapehu Gulch (southeast of the project area) and passed through various cane fields, including Field # 3 within the current project area, for a distance of roughly two miles before reaching Honomū Mill. The alignment of Site 31238 is clearly visible on a U.S.G.S. aerial photograph taken in 1954 (Figure 26), but can no longer be seen in a 1977 aerial image (see Figure 27), indicating that it was removed sometime after 1954. Currently, the ditch cut is overgrown with *hala*, ironwood, and gunpowder trees, and is in poor condition. With the exception of modern debris consisting of a refrigerator and an aluminum beer can, no cultural material potentially associated with the site was observed. This section of Site 31238 is highly eroded, and the infrastructural elements that were formally associated with the flume are no longer present. Therefore, the site retains its integrity of location as the former route of a flume, but little else. This site is assessed as significant under Criteria a and d (see discussion below).



Figure 34. Site 31238 ditch, V-shaped cut located at the ditch's eastern end, view to the northwest.



Figure 35. Site 31238, eroded and overgrown section along the gulch bank, view to the west.

5. SIGNIFICANCE EVALUATIONS AND TREATMENT RECOMMENDATIONS

The recorded archaeological site is assessed for its significance based on criteria established and promoted by the DLNR-SHPD and contained in the Hawai'i Administrative Rules 13§13-284-6. For a resource to be considered significant it must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

- a Be associated with events that have made an important contribution to the broad patterns of our history;
- b Be associated with the lives of persons important in our past;
- c Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
- d Have yielded, or is likely to yield, information important for research on prehistory or history;
- e Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

The significance and recommended treatment for the two recorded sites is presented in Table 4 and discussed below.

Table 4. Site significance and treatment recommendation.

<i>Site #</i>	<i>Site Type</i>	<i>Temporal Affiliation</i>	<i>Significance</i>	<i>Recommended Treatment</i>
50-10-26-24212	Hilo Railroad-Hawai'i Consolidated Railway bed	1908-1946	a, d	No further work
50-10-26-31238	Flume	1890-mid 1900s	a, d	No further work

SITE 50-10-26-24212

Site 24212, the railroad bed, is considered historically significant under Criteria a for its association with the development of commercial agriculture (sugarcane) during the early twentieth century, which dominated Hawai'i's economy until the late twentieth century. The railbed cut is highly eroded, and no other infrastructural elements associated with the railroad were observed. Additionally, the site is also considered significant under Criterion d, as it has also yielded locational information concerning the evolution of the infrastructural components of the plantation, especially as it relates to changes in transportation networks and technology. The current study has adequately documented the portion of Site 24212 within the project area, and no further historic preservation work is recommended.

SITE 50-10-26-31238

Site 31238, the former route of a permanent flume, is considered significant under Criterion a for its association with the development of commercial agriculture (sugarcane) in Hawai'i during the early twentieth century and under Criterion d for information it yielded relative to the history of the development of commercial agriculture in South Hilo District, and with the evolution and implementation of infrastructural components associated with the Honomū plantation. The majority of the flume route that formally traversed the current study area has been destroyed, and only a small section of the former flume route is located within the project area. This section is highly eroded, and the structural elements that were formally associated with the flume are no longer present. No further historic preservation work is recommended.

6. STATEMENT OF EFFECT

Given the above recommendations of no further historic preservation work for the two Historic Period sites documented within the current study area, the recommended determination of effect for the current project is “no historic properties affected.”

REFERENCES CITED

- Bains, J.
1913 *Around About Hilo. In The Mid-Pacific Magazine*, pp. 356-357. vol. V. Alexander Hume Ford.
- Best, G.
1978 *Railroads of Hawaii: Narrow and Standard Gauge Common Carriers*. Golden West Books, San Marino, CA.
- Bird, I.
1974 *Six Months in the Sandwich Islands*. Charles E. Tuttle Co., Inc., Rutland, Vermont.
- Boundary Commission
1874a Reel #1, Boundary Commission Book Vol. B. Microfilm. Mo'okini Library. University of Hawai'i at Hilo. Hawaiian Reference Collection.
1874b Reels #1 and 2, Boundary Commission Book Vol. D No. 5. Microfilm. Mo'okini Library. University of Hawai'i at Hilo. Hawaiian Reference Collection.
- Chinen, J. J.
1958 *The Great Mahele: Hawaii 's Land Division of 1848*. University of Hawaii Press, Honolulu.
1961 *Original Land Titles in Hawaii*. Privately published.
- Coan, T.
1882 *Life in Hawaii: An Autobiographic Sketch of Mission Life and Labors 1835-1881*. Randolph, New York.
- Desilets, M., A. Kasberg, and R. B. Rechtman
2004 *Archaeological and Limited Cultural Assessment of TMKs: 3-2-9-03: 13, 29, and 60, Wailea Ahupua'a, South Hilo District, Island of Hawai'i*. Rechtman Consulting, LLC Report RC-0247. Prepared for McCully Works, Inc., Hilo, Hawai'i.
- Dorrance, W., and F. Morgan
2000 *Sugar Islands: The 165-Year Story of Sugar in Hawaii*. Mutual Publishing, Honolulu.
- Ellis, W.
2004 *Journal of William Ellis, Narrative of a Tour of Hawaii, or Owhyee; with remarks on the History, Traditions, Manners, Customs and Language of the Inhabitants of the Sandwich Islands*. Advertiser Publishing Co., Ltd., Honolulu.
- Escott, G.
2011 *An Archaeological Assessment of 3.5 Acres Along the Kolekole Stream in Kaiwiki 3 Ahupua'a, South Hilo District, Hawai'i [TMK: (3) 2-9-03:003]*. Scientific Consultant Services, Inc. Prepared for Douglas B. Goehring & Dawn Goehring.
- Evening Bulletin Industrial Edition
1909 Honomu Sugar Company. *Evening Bulletin Industrial Edition* [Honolulu]. 25 March: 30.
- Garavoy, J.
2005 "Ua koe ke kuleana o na kanaka" (Reserving the rights of Native Tenants): Integrating Kuleana Rights And Land Trust Priorities in Hawaii. *Harvard Environmental Law* 29:523-571.
- Giambelluca, T. W., Q. Chen, A. G. Frazier, J. P. Price, Y.-L. Chen, et al.
2013 Online Rainfall Atlas of Hawai'i. *Bulletin of the American Meteorological Society* 94(3):313-316.
- Glennon, G., L. M. U. Kepa 'a, and M. R. Clark
2019 *An Archaeological Assessment for the County of Hawai'i's Kolekole Gulch Park Accessibility Improvements Project, TMK: (3) 2-8-015:015, Kuhua Ahupua'a, South Hilo District, Island of Hawai'i*. ASM Affiliates Project Number 31480. Prepared for Geometrician Associates, LLC, Hilo, HI.

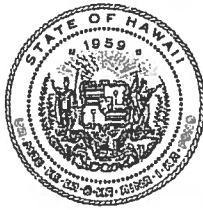
- Hammatt, H. H., and B. Colin
1998 *Archaeological Assessment for Seismic Retrofitting for the Kolekole Stream Bridge Wailea, South Hilo District, Hawaii Island*. Prepared for Cultural Surveys Hawaii Prepared For Engineering Concepts, Inc.
- Handy, E. S. C., and E. G. Handy
1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*. Bernice P. Bishop Museum Bulletin 233. Bishop Museum Press, Honolulu.
- Handy, E. S. C., E. G. Handy, and M. K. Pukui
1991 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*. Bernice P. Bishop Museum Bulletin 233. Bishop Museum Press, Honolulu.
- Haun, A. E., and D. Henry
2014 *Archaeological Inventory Survey TMK: (3) 2-9-02:083 Hakalau Nui Ahupuaa, South Hilo District, Island of Hawaii*. Haun & Associates 1035-041514. Prepared for Chad and Jennifer Walker, Pearl City, HI.
- Hitch, T.
1992 *Islands in Transition: The Past, Present, & Future of Hawaii 's Economy*. First Hawaiian Bank, Honolulu.
- Hudson, A.
1932 *The Archaeology of East Hawaii*. Bernice P Bishop Museum.
- Kalākaua, L. D.
1888 *The Legends and Myths of Hawaii. The Fables and Folk-Lore of a Strange People*. Charles L. Webster & Company, New York.
- King, R.
n.d. Hawaiian Land Titles. n.d. Electronic document, <https://ags.hawaii.gov/wp-content/uploads>, accessed May 15, 2020.
- Klein, G., M. Koob, and D. Lee
1985 *Load Capacity and Service Life Study of Hamakua Coast Steel Trestle Bridges*. HI-HWY-82-1. Prepared for State of Hawaii Department of Transportation, Highways Division-Design Branch, Honolulu.
- Kuykendall, R.
1938 *The Hawaiian Kingdom 1778-1854. Foundation and Transformation*, vol. 1. 3 vols. University Press of Hawaii, Honolulu.
- Kuykendall, R., and A. G. Day
1976 *Hawaii: A History; From Polynesian Kingdom to American Statehood*. Prentice-Hall, Englewood Cliffs, New Jersey.
- Lands, U. S. C. o. P.
1948 *Statehood for Hawaii Hearings Before the Subcommittee on Territories and Insular Affairs of the Committee on Public Lands U.S. Government Printing Office, Washington*.
- Lane, J. C. (editor)
1890 *Directory and Hand-Book of the Kindgom of Hawaii*. The Pacific Press Publishing Company, Oakland, CA.
- Lila, M.
1872 He inoa no Miss Kaiewe, ka Hiapo a B. Kuhea. *Ka Nupepa Kuokoa* [Honolulu]. 17 February: 3. Electronic document, <https://www.papakilodatabase.com>, accessed 08/28/2020.

References Cited

- Lyman, C.
1925 *Around the Horn to the Sandwich Islands and California, 1845-1850*. Yale University Press, New Haven.
- Maly, K.
1994 Appendix A: Historical Documentary Research. In *Archaeological Inventory Survey, Chin Chuck Road Project Area, Land of Hakalau Nui, South Hilo District, Island of Hawaii (TMK:2-9-02:23 and 2-9-04:56)*. edited by A. Walker and P. H. Rosendahl. Paul H. Rosendahl, Ph.D., Inc. 1563-111194. Prepared for Mr. Eben Dale, C. Brewer Homes, Inc. c/o PBR Hawaii, Hilo, Hawaii.
- 2002 *The Māhele 'Āina (The Land Division) an Overview of Documentation Found in the Claims and Awards of the Māhele*. Prepared for Kumu Pono Associates, LLC.
- Maly, K., and O. Maly
2006 *Hilo Palikū - Hilo of the Upright Cliffs: A study of Cultural-Historical Resources of Lands in the Laupāhoehoe Forest Section, Ahupua'a of the Waipunalei-Mauiuanui Region, North Hilo District, Island of Hawai'i (TMK Overview Sheet 3-7-01)*. Kumu Pono Associates KPA Study HiHETF116-Laupāhoehoe (120506a). Prepared for United States Department of Agriculture Forest Service - Institute of Pacific Islands Forestry, Hilo.
- MKE and Fung (M. K. E. Associates LLC and Fung Associates, Inc.)
2013 *Hawaii State Historic Bridge Inventory And Evaluation*. Prepared for State of Hawai'i, Department of Transportation, Highway Division, Honolulu.
- Oliver, D.
1961 *The Pacific Islands*. University of Hawaii Press, Honolulu.
- PHRI (Paul H. Rosendahl, Ph.D. Inc.)
1991 *Historical Research: Old Government Road, Hawaii Tropical Botanical Garden Project Area, Land of Onomea, South Hilo District, Island of Hawaii (TMK:2-7-10:1,22)*. 1032-061791. Prepared for Ms. Sandra Schutte, Roehrig, Roehrig, Wilson, Hara, Schutte & DeSilva.
- Pukui, M. K., S. H. Elbert, and E. Mo'okini
1974 *Place Names of Hawaii*. Revised and Expanded ed. University of Hawaii Press, Honolulu.
- Rosendahl, P. H.
2001a *Archaeological-Historical Assessment, Lot 5 - Hakalau Estates Subdivision, Land of Hakalau Nui, North Hilo District, Island of Hawaii (TMK:2-9-02: Por 1)*. Paul H. Rosendahl, Ph.D., Inc. 2174-090101. Prepared for John Cross, Mauna Kea Agribusiness Co., Inc., Papaikou, HI.
- 2001b *Archaeological-Historical Assessment, Lot 10 - Hakalau Estates Subdivision, Land of Hakalau Nui, North Hilo District, Island of Hawaii (TMK:3-2-9-02:Por.1)*. Paul H. Rosendahl, Ph.D., Inc. 2174-092301. Prepared for Mauna Kea Agribusiness Company, Inc.
- 2009 *Archaeological Inventory Survey and Cultural Impact Assessment, Hakalau Coastal Parcel. Land of Hakalau, South Hilo District, Island of Hawaii (TMK:3-2-9-79,81)*. Paul H. Rosendahl, Ph.D., Inc. 2684-070908. Prepared for Jeffery Melrose, Island Planning.
- Sheldon, H. L.
1882 *Reminiscences of Honolulu*. *Saturday Day Press* [Honolulu]. 9 December: 1, accessed 08/28/2020.
- Sherrod, D., J. Sinton, S. Watkins, and K. Brunt
2007 *Geologic Map of the State of Hawai'i*. U.S. Department of the Interior, U.S. Geological Survey. Open-File Report 2007-1089. Electronic document, <http://pubs.usgs.gov/of/2007/1089>, accessed Apr 27, 2018.
- Soehren, L.
2005 *A Catalog of Hawai'i Place Names Compiled from the Records of the Boundary Commission and the Board of Commissioners to Quiet Land Title of the Kingdom of Hawaii. Part 1: Puna and Hilo*. 2005. Electronic document, <http://ulukau.org/cgi-bin/hpn?>, accessed September 14, 2016.

- Soil Survey Staff
2017 Web Soil Survey. *United State Deparment of Agriculture, Natural Resources Conservation Service.*
- Stokes, J., and T. S. Dye
1991 *Heiau of the Island of Hawai'i: A Historic Survey of Native Hawaiian Temple Sites.* Bishop Museum Bulletin in Anthropology 2. Bishop Museum Press, Honolulu.
- Thrum, T.
1908 Heiaus and Heiau Sites Throughout the Hawaiian Islands. In *Hawaiian Almanac and Annual for 1909*, pp. 38-42. edited by T. Thrum. Thos. G. Thrum, Honolulu.
- Thurston, L.
1913 Railroading in Hilo. In *Hawaiian Almanac and Annual for 1914*. edited by T. Thrum. Thos. G. Thrum, Honolulu.
- Walker, A., and P. H. Rosendahl
1994a *Archaeological Inventory Survey, Chin Chuck Road Project Area, Land of Hakalau Nui, South Hilo District, Island of Hawaii (TMK:2-9-02:23 and 2-9-04:56).* Paul H. Rosendahl, Ph. D., Inc. 2174-092301. Prepared for Mauna Kea Agribusiness Company, Inc.
- 1994b *Interim Report: Archaeological Inventory Survey, Chin Chuck Road Project Area, Land of Hakalau Nui, South Hilo District, Island of Hawai'i (TMK:2-9-02:23 and 2-9-04-:56).* Paul H. Rosendahl, Ph. D., Inc. 1563-102894. Prepared for Mr. Eben Dale, C. Brewer Homes, Inc. c/o PBR Hawaii.

DAVID Y. IGE
GOVERNOR OF
HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD., STE 555
KAPOLEI, HI 96707

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
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ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

November 8, 2021

Samuel Lemmo, Administrator
State of Hawaii, Office of Conservation and Coastal Lands
Department of Land and Natural Resources
1151 Punchbowl St., Room 131
Honolulu, HI 96813
sam.j.lemmo@hawaii.gov

IN REPLY REFER TO:
Project No. 2021PR00826
Doc No. 2111NM02
Archaeology

Dear Samuel Lemmo:

SUBJECT: HRS Chapter 6E-42 Historic Preservation Review
Conservation District Use Application for Holcomb Family Trust
Archaeological Inventory Survey
Mālamalamaiki Ahupua'a, South Hilo District, Island of Hawai'i
TMK: (3) 2-8-012:028

This letter provides the State Historic Preservation Division's (SHPD's) review of the State of Hawai'i, Department of Land and Natural Resources, Office of Conservation and Coastal Lands (OCCL) Conservation District Use Application (CDUA) and the supporting document titled *An Archaeological Inventory Survey of the 6.5-Acre Holcomb Family Trust Parcel, TMK: (3) 2-8-012:028, Mālamalamaiki 1st and 2nd Ahupua'a, South Hilo District, Island of Hawai'i* (Glennon and Brandt, November 2021). The original submittal was received by SHPD on July 17, 2021, and included the CDUA, a Google Earth overview of the project area, the archaeological inventory survey (AIS), a SHPD 6E Submittal Form, and the construction plan (Submission No. 2021PR00826.001). SHPD requested revisions to the AIS on November 2, 2021, and the revisions were addressed on November 5, 2021 (Submission No. 2021PR00826.004).

ASM Affiliates completed the AIS for the 6.5-parcel at the request of the Holcomb Family Trust (landowner). The landowner proposes the development of a single-family residence (approximately 3,018 square feet).

The Glennon and Brandt (November 2021) AIS fieldwork was conducted on August 13 and 24, 2021 and included a 100% surface survey with transects spaced 10 meters apart. Ground visibility was adequate. No subsurface testing occurred. Sites were documented with GPS, site forms, site mapping, and photography. The AIS documented two sites (Sites 50-10-26-24212 and 50-10-26-31238). Site 24212 is a portion of the Hilo Railroad-Hawai'i Consolidated Railway bed that was previously identified north of the project area by Desilets et al. (2004). None of the associated railroad infrastructure remains in the project area and only the mechanical cuts and location were documented. Construction of the railway was completed in 1911. Site 31238 is the former flume location as evidenced by the cut earthen ditch although no associated infrastructure was identified. The flume was built by the Honomū Sugar Company sometime around the late 1890s.

The two identified sites (Sites 50-10-26-24212 and 50-10-26-31238) within the project area both only retain sufficient integrity of location and are assessed as significant in accordance with HAR §13-284-6 under Criterion d for the information they have yielded regarding the evolution of infrastructure components of the plantation during the twentieth century and under Criterion a for their association with the development of commercial sugarcane agriculture in Hawai'i during the twentieth century. The report recommends no further work for both sites, as both are assessed as having been adequately documented.

Samuel Lemmo
November 8, 2021
Page 2

SHPD agrees with the site integrity, significance assessments and that Sites 50-10-26-24212 and 50-10-26-31238 have been adequately documented and thus agrees with the recommendation for no further work for the two identified sites within the project area. Therefore, SHPD's effect determination is "No historic properties affected for the current project.

This AIS report (Glennon and Brandt, November 2021) satisfies the requirements of HAR §13-276-5. **It is accepted.** Please send two hard copies of the document, clearly marked FINAL, along with a text-searchable PDF copy of the document and a copy of this acceptance letter to the Kapolei SHPD office, attention SHPD Library. Additionally, please upload a text-searchable PDF version of the final AIS to HICRIS Project No. 2021PR00826 using the Project Supplement option and send a PDF copy to lehua.k.soares@hawaii.gov.

SHPD hereby notifies the County that the AIS has been accepted and the permit issuance process may proceed.

Please contact Nicole A. Mello, Historic Preservation Archaeologist IV, at Nicole.Mello@hawaii.gov for any matters regarding archaeological resources or this letter.

Aloha,

Alan Downer

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: Rachel Beasley, DLNR, Office of Conservation and Coastal lands, rachel.e.beasley@hawaii.gov
Matt Clark, ASM Affiliates, mclark@asmaffiliates.com
Jason Knable, Agent, jknable@carlsmith.com
Kelly Holcomb, Landowner, sureboard@gmail.com

A Cultural Impact Assessment for the Proposed Single-Family Development of the Holcomb Family Trust Parcel

TMK: (3) 2-8-012:028

Mālamalamaiki 1st and 2nd Ahupua'a
South Hilo District
Island of Hawai'i



Prepared By:

Halena Kapuni-Reynolds, M.A.,
and Lokelani Brandt, M.A.

Prepared For:

Carlsmith Ball, LLP
121 Waiānue Avenue Ave.
Hilo, HI 96720

October 2020



Archaeology • History • Anthropology • Architectural History

Hilo Office: (808) 969 6060 Fax: (808) 443 0055
507-A E Lanikaula Street, Hilo, HI 96720

Honolulu Office: (808) 439-8089 Fax: (808) 439-8087
820 Milliani Street, Suite 700, Honolulu, HI 96813

ASM Project Number 35400.00



A Cultural Impact Assessment for the Proposed Single-Family Development of the Holcomb Family Trust Parcel

TMK: (3) 2-8-012:028

Mālamalamaiki 1st and 2nd Ahupua'a
South Hilo District
Island of Hawai'i



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1. INTRODUCTION

At the request of the Holcomb Family Trust (landowner), ASM Affiliates (ASM) has prepared this Cultural Impact Assessment (CIA) for the proposed development of a single-family dwelling located on a roughly 6.5-acre parcel and access easement located in Mālamalamaiki 1st and 2nd Ahupuaʻa, South Hilo District, Island of Hawaiʻi (Figures 1, 2 and 3). This CIA will serve as a supplemental document for an Environmental Assessment triggered by a Conservation District Use Application (CDUA). The landowner is proposing to construct a one-story single family-residence, a paved drive way, and landscaping (Figure 4).

This CIA is intended to inform an Environmental Assessment (EA) being prepared to support a Conservation District Use Application (CDUA). This CIA is conducted in compliance with HRS Chapter 343, pursuant to Act 50 and in accordance with the Office of Environmental Quality Control (OEQC) *Guidelines for Assessing Cultural Impacts*, adopted by the Environmental Council, State of Hawaiʻi, on November 19, 1997 (OEQC 1997). As stated in Act 50, which was proposed and passed as Hawaiʻi State House of Representatives Bill No. 2895 and signed into law by the Governor on April 26, 2000, specifically acknowledges the State's responsibility to protect native Hawaiian cultural practices. Act 50 further states that "environmental assessments . . . should identify and address effects on Hawaiʻi's culture, and traditional and customary rights" and that "native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the 'aloha spirit' in Hawaiʻi. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on governmental agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups."

The report is divided into four main sections, beginning with an introduction and a general description of the proposed project area. To provide a physical and cultural context, section two of this report includes a detailed cultural and historical background for the general study area, which includes background information for both Mālamalamaiki 1st and 2nd and the greater district of South Hilo. This section also includes a presentation of prior studies conducted within the vicinity of the proposed development activity. The results of the consultation process are presented in section three of this report and section four concludes with a discussion of potential cultural impacts as well as appropriate actions and strategies that may help to mitigate any such impacts.

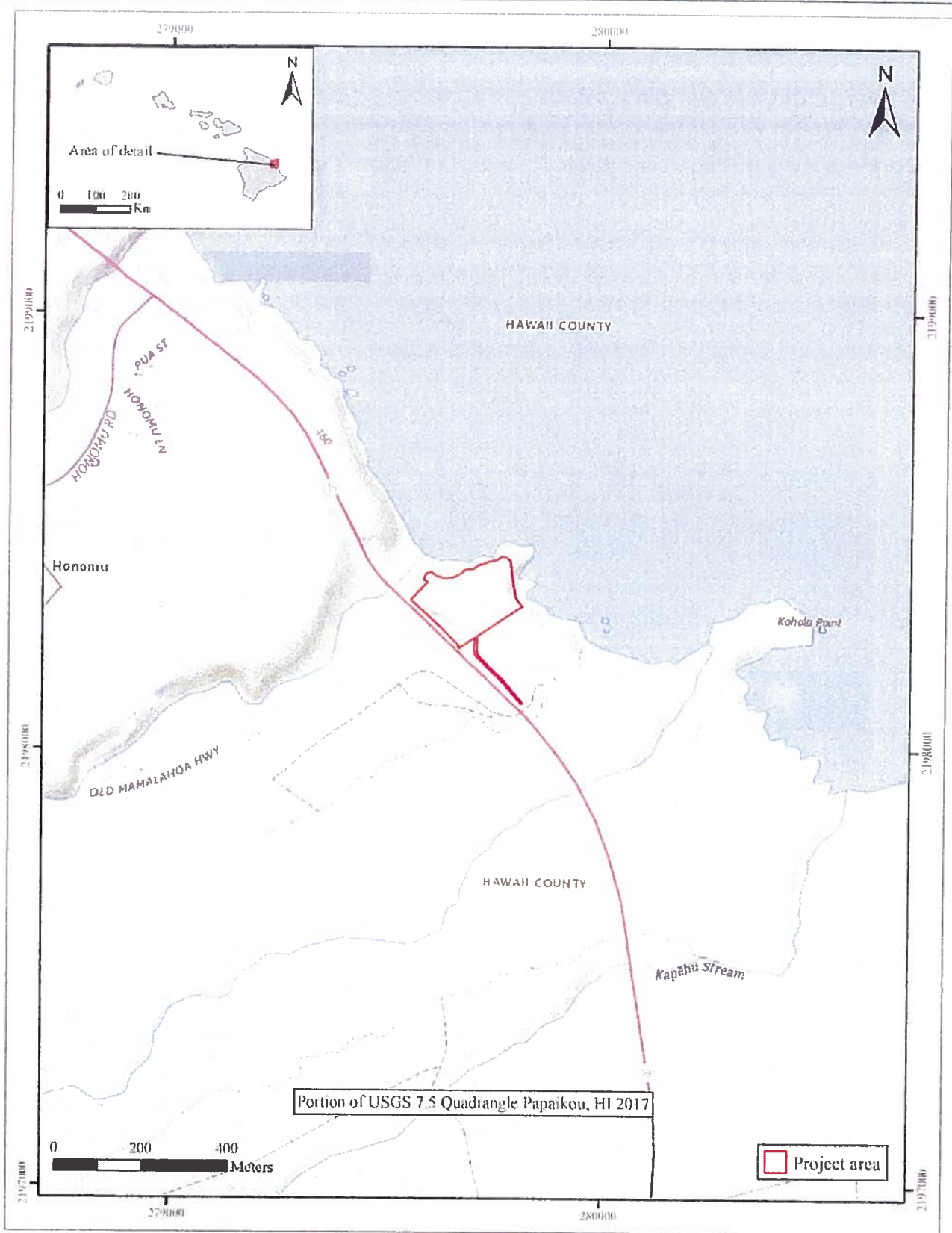


Figure 1. Study area location.





Figure 3. Google Earth™ satellite image showing project area location.

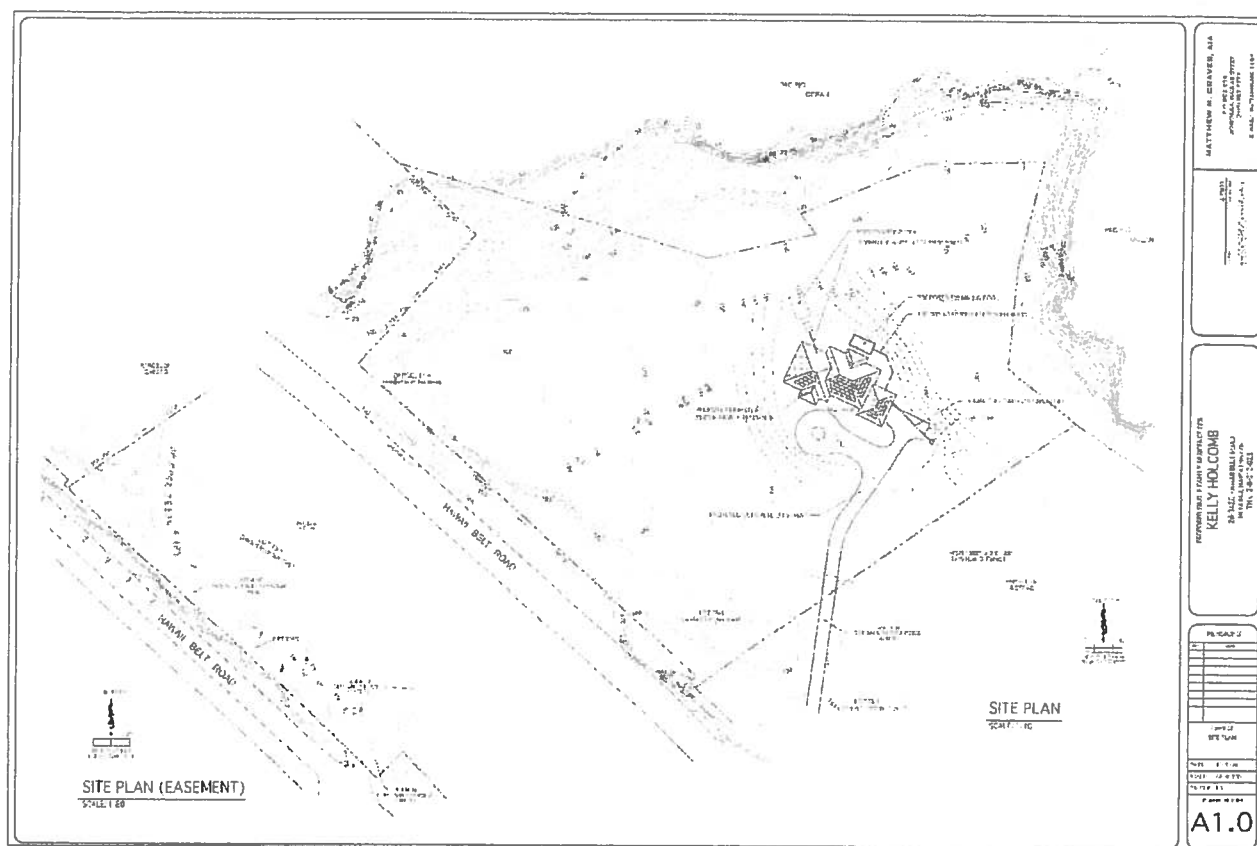


Figure 4. Proposed development plans.

PROJECT AREA DESCRIPTION

The project area (TMK: (3) 2-8-012:028) is located along coastal sea bluffs (Figure 5), approximately 0.9 kilometers south of Honomū town, *makai* of Māmalahoa Highway within Mālamalamaiki 2nd Ahupuaʻa, South Hilo District, Island of Hawaiʻi (see Figures 1, 2, and 3). The project area is roughly 6.5 acres of gently sloping tableland, with elevations ranging from 45 to 150 feet (14–46 meters) above sea level. The project area is accessed through a gated, overgrown easement along the *makai* edge of Māmalahoa Highway (Figure 6). The gated easement begins at the southwest corner of the neighboring parcel (TMK: (3) 2-8-012:029) and extends northwest for approximately 200 meters before entering into the project area. The north boundary of the parcel is bounded by the steep-sided Mālamalamaiki Gulch. To the east, it is bounded by rocky coastline cliffs and the Pacific Ocean, to the west by the Māmalahoa Highway, and to the south by an undeveloped parcel (TMK: (3) 2-8-012:029) (see Figure 5). A hog wire fence line defines the boundary of the two parcels along this southern edge. The Honomū Stream flows through Mālamalamaiki Gulch where it empties into the Pacific Ocean just north of the project area's northern boundary (Figure 7). The former route of the Hawaiʻi Consolidated Railroad (State Inventory of Historic Places (SIHP) Site 50-10-26-24212), evidenced by a deep cut in the terrain, extends northwest to southeast along a portion of the parcel's western boundary (Figure 8).

As a result of nearly a century of sugarcane cultivation, the terrain within the majority of the project area consists of level soil areas covered primarily in invasive plant species. The level, central portion of the property consists of open areas of soil covered by a thick, tall growth of Guinea grass (*Megathyrsus maximus*) and molasses grass (*Melinis minutiflora*) (Figure 9). The vegetation along the parcel's outer edges consists of a dense growth of mostly invasive trees, shrubs, and vines. Dominant species observed within the parcel consist of gun powder trees (*Trema orientalis*), guava (*Psidium* sp.), night-blooming jasmine (*Cestrum nocturnum*), lantana sp., Bing-a-Bing (*Macaranga mapp*), African Tulip (*Spahodea campanulate*), ginger sp. and various other grasses and vines. Along the coastal edges of the property are grooves of hala (*Pandanus tectorius*) intermixed with ironwood trees (*Casuarinaceae equisetifolia*) and ʻiʻi plants (*Cordyline fruticosa*) (Figures 10, and 11). A groove of Alexander palms (*Ptychotherma elegans*) extends along the western edge of the parcel within the former route of The Hawaiʻi Consolidated Railroad (see Figure 7).

Located just outside of the eastern property boundary along the coastline is a wooden ladder that descends from the cliff to the rocky shoreline below (Figures 12 and 13). Although this ladder is located outside of the project area boundaries, it is worth noting that, in more recent times, the coastal cliffs that bound the subject parcel have been utilized to access the marine resources along this portion of the coast. Additionally, located near the edge of the Mālamalamaiki Gulch and the parcel's northern boundary is a modern rubbish pile, which appears to have been part of a small campsite.

Soils within the project area (Figure 14) are classified as Hilo hydrous silty clay loam on a 10-20 percent slope (Soil Survey Staff 2017). These strongly acidic soils dehydrate irreversibly into fine gravel size aggregates and have formed overlying basalt that originated from Mauna Kea Volcano 64,000 to 300,000 years ago (Figure 15) (Sherrod et al. 2007). These soils historically were used for the cultivation of sugarcane. The study area receives a mean annual rainfall of approximately 3,500 millimeters, with the majority of the rain occurring during the spring months, with the most typically occurring in March, and the least occurring in June (Giambelluca et al. 2013). The climate is generally cool, with a mean annual temperature ranging from 72 to 77 degrees Fahrenheit throughout the year.



Figure 5. Aerial of the project area.



Figure 6. Gated entryway into the project area adjacent to Māmalahoa Highway, view to the north.



Figure 7. Honomū Stream and Mālamalamaiki Gulch, view to the south.



Figure 8. Alexander Palm grove within the former route of the Hawai'i Consolidated Railroad along the western edge of the parcel. view to the south.



Figure 9. Open grassy area in the central part of the project area surrounded by mixed vegetation, view to the southeast.



Figure 10. Mixed vegetation along the western edge of the project area, view to the northwest.



Figure 11. Coastal vegetation consisting of *hala*, ironwood, and *kī*, view to the northwest.



Figure 12. Aerial of the shoreline with ladder on the cliff face, view to the west.



Figure 13. Wooden ladders located just outside of the project areas eastern boundary descending the coastal cliff to the rocky shoreline below.

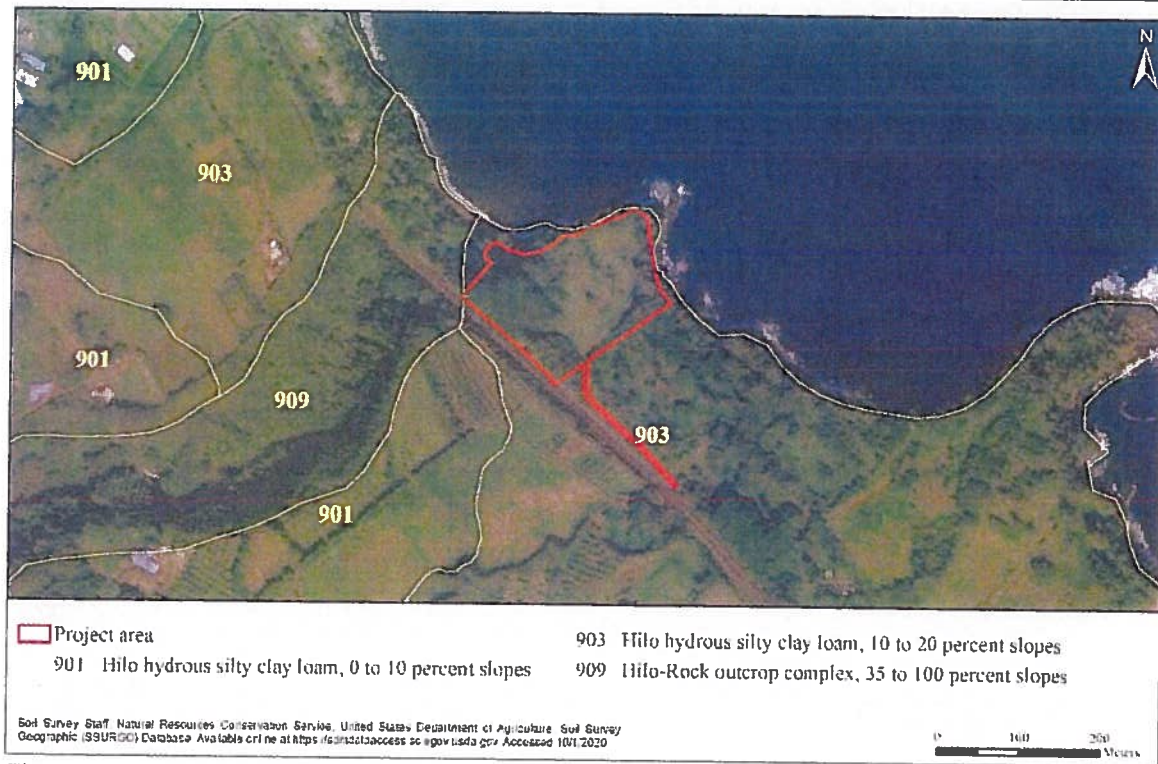


Figure 14. Soils within the project area.

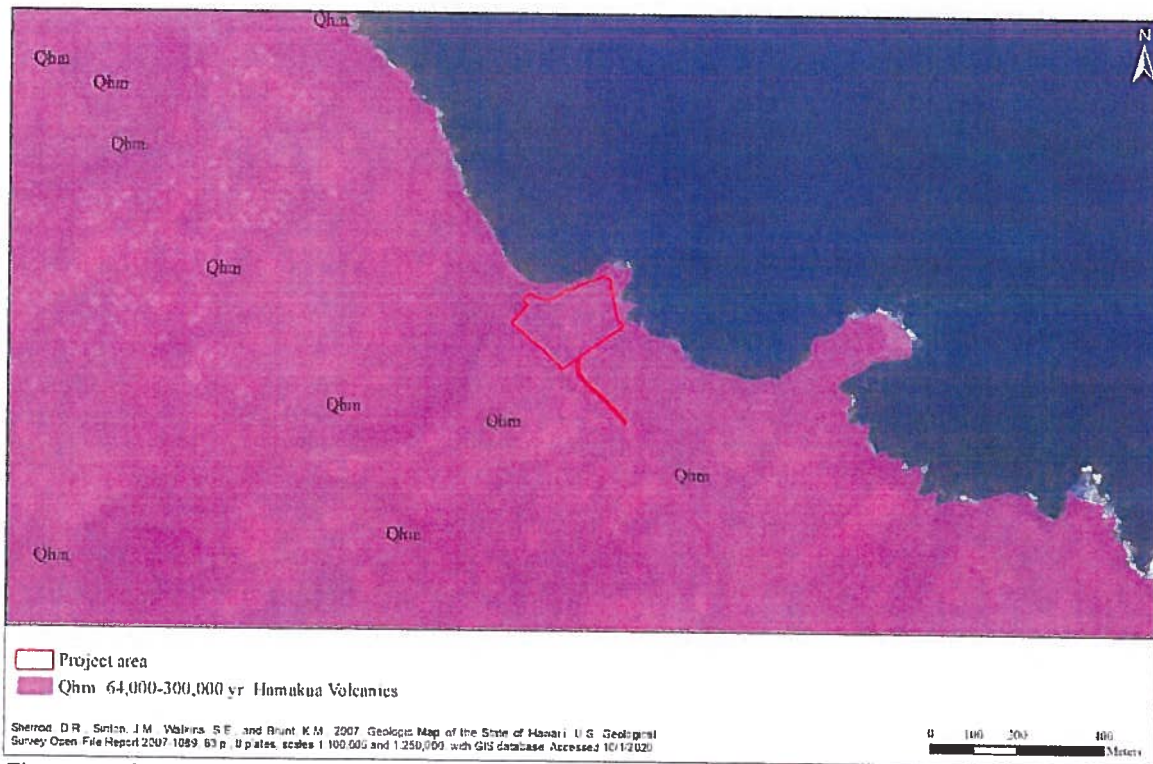


Figure 15. Geology within the project area.

2. BACKGROUND

As specified in the OEQC *Guidelines for Assessing Cultural Impacts* (1997:1), "...the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment." For this cultural impact assessment, the *ahupua'a* of Mālamalamaiki (inclusive of both Mālamalamaiki 1st and 2nd) is considered the study area, while the entirety of TMK: (3) 2-8-012:028 is referred to as the project area. To generate a set of expectations regarding the nature of cultural resources that might be encountered within the current project area and to establish a context within which to assess the significance of such resources, the background section begins with a general culture-historical context. This is followed by culture-historical background information concerning the history of Mālamalamaiki. A background of Hilo Palikū, the broader regional designation in which Mālamalamaiki is situated, also falls within the parameters of the OEQC guidelines and ensures that a broader set of cultural practices and histories are considered. Following this background section is a discussion of relevant prior archaeological studies that have been conducted in the vicinity of the project area.

RESEARCH METHODS

The culture-historical context and summary of previously conducted archaeological and cultural research presented below are based on research conducted by ASM Affiliates at various physical and digital repositories. Primary English language and Hawaiian language resources were found at various state agencies, including the State Historic Preservation Division, Hawai'i State Archives, the Department of Accounting and General Services Land Survey Division as well as the Edmund Olson Trust Archives in Pāpa'ikou, Hilo. Digital collections provided through the Office of Hawaiian Affairs Papakilo and Kīpuka databases, Waihona 'Āina, the Ulukau Hawaiian Electronic Library Ulukau, the Hawai'i Genealogical Indexes, and Newspapers.com provide further historical context and information. Lastly, secondary resources stored at ASM Affiliates' Hilo office offer general information regarding the history of land use, politics, and culture change in Hawai'i, enhances the broad sampling of primary source materials that are cited throughout this cultural impact assessment.

CULTURE-HISTORICAL CONTEXT

The following subsections are intended to provide a general overview of Hawaiian origins, settlement, expansion, and describes some of the broad sociopolitical and cultural transformations that developed over time. The discussion continues with a summary of traditional ideologies associated with the land and the evolution of uniquely Hawaiian land stewardship practices. It is within this context that the history specific to the lands of Mālamalamaiki developed.

Generalized Model of Hawaiian Origins and Settlement

While the question of when Hawai'i was first settled by Polynesians remains contested, scholars working in the fields of archaeology, folklore, Hawaiian studies, and linguistics have offered several theories. With advances in palynology and radiocarbon dating techniques, Kirch (2011), Athens et al. (2014), and Wilmshurst et al. (2011) have argued that Polynesians arrived in the Hawaiian Islands sometime between A.D. 1000 and A.D. 1200. This initial migration on intricately crafted *wa'a kaulua* (double-hulled canoes) to Hawai'i from Kahiki, the ancestral homelands of Hawaiian deities and peoples from southern Pacific islands, occurred at least from initial settlement to the 13th century. According to Fornander (1969), Hawaiians brought from their homeland certain Polynesian customs and beliefs: the major gods Kāne, Kū, Lono, and Kanaloa (who have cognates in other Pacific cultures); the *kapu* system of political and religious governance; and the concepts of *pu'uhonua* (places of refuge), *'aumakua* (ancestral deity), and *mana* (divine power). Archaeologist Kenneth Emory who worked in the early to mid-20th century reported that the sources of early Hawaiian populations originated from the southern Marquesas Islands (Emory in Tatar 1982). However, Emory's theory is not universally accepted, as Hawaiian scholars in the past and present have argued for a pluralistic outlook on ancestral Hawaiian origins from Kahiki (Case 2015; Fornander 1916-1917; Kamakau 1866; Kikiloi 2010; Nakaa 1893; Poepoe 1906).

While stories of episodic migrations were widely published in the Hawaiian language by knowledgeable and skilled *kū'auhau* (individuals trained in the discipline of remembering genealogies and associated ancestral stories), the cultural belief that living organisms were *hānau 'ia* (born) out of a time of eternal darkness (*pō*) and chaos (*kahuli*) were brought and adapted by ancestral Hawaiian populations to reflect their deep connection to their environment. As an example, the *Kumulipo*, Hawai'i's most famed *ko'ihomua* (a cosmogonic genealogical chant), establishes a birth-rank genealogical order for all living beings (Beckwith 1951; Liliuokalani 1978). One such genealogical relationship that remains widely accepted in Hawai'i is the belief that *kalo* (taro) plants (in addition to all other plants, land animals,

and sea creatures), are elder siblings to humans (Beckwith 1951). This concept of hierarchical creation enforces the belief that all life forms are intimately connected, evidencing the cultural transformations that occurred in the islands through intensive interaction with their local environment to form a uniquely Hawaiian culture.

In Hawai'i's ancient past, inhabitants were primarily engaged in subsistence-level agriculture and fishing (Handy et al. 1991). Following the initial settlement period, communities clustered in the *ko'olau* (windward) shores of the Hawaiian Islands where fresh water was abundant. Sheltered bays allowed for nearshore fisheries (enriched by numerous estuaries) and deep-sea fisheries to be easily accessed (McEldowney 1979). Widespread environmental modification on land also occurred as early Hawaiian *kanaka mahi'ai* (farmers) developed new subsistence strategies, adapting their familiar patterns and traditional tools to work efficiently in their new home (Kirch 1985; Pogue 1978). Areas with the richest natural resources became heavily populated overtime, resulting in the population's expansion to the *kona* (leeward) side of the islands and to more remote areas (Cordy 2000).

As populations expanded, major socioeconomic changes occurred, such as the development of complex social stratification systems and intensive land modification. During this expansion period, additional migrations to Hawai'i occurred from the islands of Tahiti. Rosendahl (1972) proposed that settlement at this time was seasonally recurrent, in which coastal sites were occupied in the summer to exploit marine resources and upland agricultural sites were maintained during the winter months. An increasing reliance on agricultural products may have caused a shift in social networks as noted by Hommon (1976), who argued that kinship links between coastal settlements disintegrated as those links within the *mauka-makai* (upland-coastal) settlements expanded to accommodate the exchange of agricultural products for marine resources. This shift is believed to have resulted in the establishment of the *ahupua'a* system sometime during the 15th century (Kirch 1985). The implications of this model include a shift in residential patterns from seasonal, temporary habitation, to the permanent dispersed habitation of both coastal and upland areas.

Overview of Traditional Hawaiian Land Management Strategies

Adding to an already complex society was the development of traditional land stewardship systems, including the *ahupua'a*. The *ahupua'a* was the principal land division that functioned for both taxation purposes and furnished its residents with nearly all subsistence and household necessities. *Ahupua'a* are land divisions that typically include multiple ecozones from *ma uka* (upland mountainous regions) to *ma kai* (shore and near shore regions), assuring a diverse subsistence resource base (Hommon 1986). Although the *ahupua'a* land division typically incorporated all of the eco-zones, their size and shape varied greatly (Cannelora 1974). Noted Hawaiian historian and scholar Samuel Kamakau summarized the ecozones that could be found in a given *ahupua'a*:

Here are some names for [the zones of] the mountains—the *mauna* or *kuahiwi*. A mountain is called a *kuahiwi*, but *mauna* is the overall term for the whole mountain, and there are many names applied to one, according to its delineations ('*ano*). The part directly in back and in front of the summit proper is called the *kuamauna*, mountaintop; below the *kuamauna* is the *kuahea*, and makai of the *kuahea* is the *kuahiwi* proper. This is where small trees begin to grow: it is the *wao nahele*. Makai of this region the trees are tall, and this is the *wao lipo*. Makai of the *wao lipo* is the *wao 'eiwa*, and makai of that the *wao ma'ukele*. Makai of the *wao ma'ukele* is the *wao akua*, and makai of there is the *wao kanaka*, the area that people cultivate. Makai of the *wao kanaka* is the '*ama'u*, fern belt, and makai of the '*ama'u* the '*apa'a*, grasslands.

A solitary group of trees is a *moku la'au* (a "stand" of trees) or an *ulu la'au*, grove. Thickets that extend to the *kuahiwi* are *ulumahele*, wild growth. An area where *koa* trees suitable for canoes (*koa wa'a*) grow is a *wao koa* and mauka of there is a *wao la'au*, timber land. These are dry forest growths from the '*apa'a* up to the *kuahiwi*. The places that are "spongy" (*naele*) are found in the *wao ma'ukele*, the wet forest.

Makai of the '*apa'a* are the *pahe'e* [*pili* grass] and '*ilima* growths and makai of them the *kula*, open country, and the '*apoho* hollows near to the habitations of men. Then comes the *kahakai*, coast, the *kahaone*, sandy beach, and the *kalawa*, the curve of the seashore—right down to the '*ae kai*, the water's edge.

That is the way *ka po'e kahiko* [the ancient people] named the land from mountain peak to sea. (Kamakau 1976:8-9)

The *maka'ainana* (commoners, literally the "people that attend the land") who lived on the land had rights to gather resources for subsistence and tribute within their *ahupua'a* (Jokiel et al. 2011). As part of these rights, residents were required to supply resources and labor to *ali'i* (chiefs) of local, regional, and island chiefdoms. The *ahupua'a* became the equivalent of a local community with its own social, economic, and political significance and served as

the taxable land division during the annual *Makahiki* procession (Kelly 1956). During the time of *Makahiki*, the paramount *ali'i* sent select members of his/her retinue to collect *ho'okupu* (tribute and offerings) in the form of goods from each *ahupua'a*. The *maka'āinana* brought their share of *ho'okupu* to an *ahu* (altar) that was marked with the image of a *pua'a* (pig), serving as a physical visual marker of *ahupua'a* boundaries. In most instances, these boundaries followed mountain ridges, hill, rivers, or ravines (Alexander 1890). However, Chinen (1958:1) reports that "oftentimes only a line of growth of a certain type of tree or grass marked a boundary; and sometimes only a stone determined the corner of a division." These ephemeral markers, as well as their more permanent counterparts, were oftentimes named as evidenced in the thousands of boundary markers names that are listed in Soehren (2005).

Ahupua'a were ruled by *ali'i 'ai ahupua'a* or chiefs who controlled the *ahupua'a* resources. Generally speaking, *ali'i 'ai ahupua'a* had complete autonomy over the *ahupua'a* they oversaw (Malo 1951). *Ahupua'a* residents were not bound to the land nor were they considered property of the *ali'i*. If the living conditions under a particular *ahupua'a* chief were deemed unsuitable, the residents could move freely in pursuit of more favorable conditions (Lam 1985). This structure safeguarded the well-being of the people and the overall productivity of the land, lest the chief loses the principal support and loyalty of his or her supporters. In turn, *ahupua'a* lands were managed by an appointed *konohiki*, oftentimes a chief of lower rank, who oversaw and coordinated stewardship of an area's natural resources (Lam 1985). In some places, the *po'o lawai'a* (head fisherman) held the same responsibilities as the *konohiki* (Jokiel et al. 2011). When necessary, the *konohiki* took the liberty of implementing *kapu* (restrictions and prohibitions) to protect the *mana* of an area's resources from environmental and spiritual depletion.

Many *ahupua'a* were divided into smaller land units termed '*ili*' and '*ili kūpono*' (often shortened to '*ili kū*'). '*Ili*' were created for the convenience of the *ahupua'a* chief and served as the basic land unit which *hoa'āina* (caretakers of particular lands) often retained for multiple generations (Jokiel et al. 2011; MacKenzie 2015). As '*ili*' were typically passed down in families, so too were the *kuleana* (responsibilities, privileges) that were associated with it. The right to use and cultivate '*ili*' was maintained within the '*ohana*', regardless of the succession of *ali'i 'ai ahupua'a* (Handy et al. 1991). Malo (1951) recorded several types of '*ili*', including the '*ili pa'a*' (a single intact parcel) and '*ili lele*' (a discontinuous parcel dispersed across an area). Whether dispersed or wholly intact, '*ili*' required a cross-section of available resources, and for the *hoa'āina*, this generally included access to agriculturally fertile lands and coastal fisheries. '*Ili kūpono*' differed from other '*ili*' lands because they did not fall under the jurisdiction of the *ahupua'a* chief. Rather, they were specific areas containing resources that were highly valued by the ruling paramount chiefs, such as fishponds (Handy et al. 1991).

Ali'i 'ai ahupua'a, in turn, answered to an *ali'i 'ai moku* (chief who claimed the abundance of the entire *moku* or district) (Malo 1951). Hawai'i Island is comprised of six *moku* (districts) that include Kona, Ka'ū, Puna, Hilo, Hāmākua, and Kohala. Although a *moku* comprises multiple *ahupua'a*, *moku* were considered geographical subdivisions with no explicit reference to rights in the land (Cannelora 1974). While the *ahupua'a* was the most common and fundamental land division unit within the traditional Hawaiian land management structure, variances occurred, such as the existence of the *kalana*. By definition, a *kalana* is a division of land that is smaller than a *moku*. *Kalana* was sometimes used interchangeably with the term '*okana*' (Lucas 1995; Pukui and Elbert 1986), but Kamakau (Kamakau 1976) equates a *kalana* to a *moku* and states that '*okana*' is merely a subdistrict. Despite these contending and sometimes conflicting definitions, what is clear is that *kalana* consisted of several *ahupua'a* and '*ili āina*'.

This form of district subdividing was integral to Hawaiian life and the product of advanced natural resource management systems. As populations resided in an area over centuries, direct-teaching and extensive observations of an area's natural cycles and resources were retained, well-understood, and passed down orally over the generations. This knowledge informed management decisions that aimed to sustainably adapt subsistence practices to meet the needs of growing populations. The *ahupua'a* system and the highly complex land management system that developed in the islands are but one example of the unique Hawaiian culture that developed in these islands.

Intensification and Development of Hawaiian Land Stewardship Practices

Hawaiian philosophies of life in relation to the environment helped to maintain both natural, spiritual, and social order. In describing the intimate relationship that exists between Hawaiians and '*āina*' (land), Kepā Maly writes:

In the Hawaiian context, these values—the "sense of place"—have developed over hundreds of generations of evolving "cultural attachment" to the natural, physical, and spiritual environments. In any culturally sensitive discussion on land use in Hawai'i, one must understand that Hawaiian culture evolved in close partnership with its' natural environment. Thus, Hawaiian culture does not have a clear dividing line of where culture and nature begins.

In a traditional Hawaiian context, nature and culture are one in the same, there is no division between the two. The wealth and limitations of the land and ocean resources gave birth to, and shaped the Hawaiian world view. The *‘āina* (land), *wai* (water), *kai* (ocean), and *lawa* (sky) were the foundation of life and the source of the spiritual relationship between people and their environs. (Maly 2001)

The *‘ōlelo no ‘eau* (proverbial saying) “*hānau ka ‘āina, hānau ke ali ‘i, hānau ke kanaka*” (born was the land, born were the chiefs, born were the commoners), conveys the belief that all things of the land, including *kanaka* (humans), are connected through kinship links that extend beyond the immediate family (Pukui 1983:57). *‘Āina* or land, was perhaps most revered, as noted in the *‘ōlelo no ‘eau* “*he ali ‘i ka ‘āina; he kauwā ke kanaka*,” which Pukui (Pukui 1983:62) translated as “[t]he land is a chief; man is its servant.” The lifeways of early Hawaiians, which were dependent entirely from the finite natural resources of these islands, necessitated the development of sustainable resource management practices. Over time, what developed was an ecologically responsive management system that integrated the care of watersheds, natural freshwater systems, and nearshore fisheries (Jokiel et al. 2011).

Disciplined and astute observation of the natural world became one of the most fundamental stewardship tools used by Hawaiians of the ancient past. The vast knowledge acquired through direct observation enabled them to detect and record the subtlest of changes, distinctions, and correlations in the natural world. Examples of their keen observations are evident in the development of Hawaiian nomenclature to describe various rains, clouds, winds, stones, environments, flora, and fauna. Many of these names are geographically unique or island-specific, and have been recorded in *oli* (chants), *mele* (songs), *pule* (prayers), *inoa* *‘āina* (place names), and *‘ōlelo no ‘eau* (proverbial sayings). Other Hawaiian arts and practices such as *hula* (traditional dance), *lapa ‘au* (traditional healing), *lawai ‘a* (fishing), *mahi ‘ai* (farming) further aided in the practice of knowing the rhythms and cycles of the natural world.

Comprehensive systems of observing and stewarding the land were coupled by the strict adherence to practices that maintained and enhanced the *kapu* and *mana* of all things in the Hawaiian world. In Hawaiian belief, all things natural, places, and even people, especially those of high rank, possessed *mana* or “divine power” (Pukui and Elbert 1986:235; Pukui et al. 1972). *Mana* was believed to be derived from the plethora of Hawaiian gods (*kini akua*) who were embodied in elemental forces, land, natural resources, and certain material objects and persons (Crabbe et al. 2017). Buck (1993) expanded on this concept noting that *mana* was associated with “the well-being of a community, in human knowledge and skills (canoe building, harvesting) and in nature (crop fertility, weather etc.)” (c.f. Else 2004:244).

To ensure the *mana* of certain resources, places, and people, *kapu* of various kinds were implemented and strictly enforced to limit over-exploitation and defilement. Elbert and Pukui (1986:132) defined *kapu* as “taboo, prohibitions; special privilege or exemption.” Kepelino noted that *kapu* associated with *akua* (deities) applied to all social classes, while *kapu* associated with *ali ‘i* were applied to the people (in Beckwith 1932). As *kapu* dictated social relationships, they also provided “environmental rules and controls that were essential for a subsistence economy” (Else 2004:246). The companion to *kapu* was *noa*, translated as “freed of taboo, released from restrictions, profane, freedom” (Pukui and Elbert 1986:268). Some *kapu*, particularly those associated with maintaining social hierarchy and gender differentiation were unremitting, while those *kapu* placed on natural resources were applied and enforced according to seasonal changes. The application of *kapu* to natural resources ensured that such resources remained available for future use. When the *ali ‘i* or the lesser chiefs (including *konohiki* and *po ‘o lawai ‘a*) determined that a particular resource was to be made available to the people, a decree was proclaimed indicating that *kapu* had been lifted, thereby making it *noa*. Although transitioning a resource from a state of *kapu* to *noa* allowed for its use, people were expected to practice sustainable harvesting methods and pay tribute to the paramount chief and the *akua* associated with that resource. *Kapu* were strictly enforced and violators faced serious consequences including death (Jokiel et al. 2011). Violators who escaped execution sought refuge at a *pu ‘uhonua*, a designated place of refuge or an individual who could pardon the accused (Kamakau 1992). After completing the proper rituals, the violator was absolved of his or her crime and allowed to reintegrate back into society.

In summary, the layering and interweaving of beliefs, land stewardship practices, and the socio-political system forms the basis of the relationship shared between the Hawaiian people and the land. It is through the analysis of these dynamic elements that we develop an understanding of the complexity of place.

MĀLAMALAMAIKI AHUPUA‘A AND THE GREATER SOUTH HILO DISTRICT

The current project area is in the *ahupua‘a* of Mālamalamaiki. “Mālamalamaiki” is translated in Pukui et al. (1974:143) as “little light.” Mālamalamaiki is located in the traditional *moku* (district) of Hilo, which is one of six *moku* on Hawai‘i Island. The Hawaiian proverb “*Hilo, mai Māwae a ka pali o Maulua*” (Pukui 1983:108) details the extent of the district spanning from Māwae, a fissure separating Hilo from the Puna District to Maulua, a land area

2. Background

which serves as a boundary marker between Hilo and the Hamākua District. Handy and Handy provides a general description of the district:

Hilo as a major division of Hawai'i included the southeastern part of the windward coast most of which was in Hamakua, to the north of Hilo Bay. This, the northern portion, had many scattered settlements above streams running between high, forested *kula* lands, now planted with sugar cane. From Hilo Bay southeastward to Puna the shore and inland are rather barren and there were few settlements. The population of Hilo was anciently as now concentrated mostly around and out from Hilo Bay, which is still the island's principal port. The Hilo Bay region is one of lush tropical verdure and beauty, owing to the prevalence of nightly showers and moist warmth which prevail under the northeasterly trade winds into which it faces. Owing to the latter it is also subject to violent oceanic storms and has many times in its history suffered semidevastation from tidal waves unleashed by earthquake action in the Aleutian area of the Pacific. (Handy et al. 1991:538)

The low-lying coastal areas of South Hilo thrived with traditional Hawaiian habitation and cultivation. Within the larger gulches and *kula* (broad plateaus) regions, were lush, fertile lands well suited for agriculture. The staple traditional crop, *kalo* (taro), was cultivated in irrigated terraces along the stream edges while *'uala* (sweet potato), *mai'a* (banana) and *kō* (sugarcane) were grown in the wet *kula* lands of the lower forest zone (Handy et al. 1991). The region had an abundance of *kukui* (candlenut), *'ulu* (breadfruit), and *niu* (coconut) groves and was also rich in marine resources. Although settlements were prominent in these areas with the increase of population and agricultural production settlements spread into the upland *kula* regions. Handy and Handy (1972), in drawing from a description given by early missionary William Ellis, provide yet another description of the fertile landscapes of South Hilo:

The light and fertile soil is formed by decomposing lava, with a considerable portion of vegetable mould. The whole is covered with luxuriant vegetation, and the greater part of it formed into plantations, where plantains, bananas, sugar-cane, taro, potatoes and melons, come to the greatest perfection. Groves of cocoa-nut and bread-fruit trees are seen in every direction, loaded with fruit, or clothed with luxuriant foliage. (Ellis in Handy and Handy 1972:539)

Traditionally, the *moku* of Hilo was divided into three *'okana* (sub-districts). Beginning in the north is Hilo Palikū, an area that extends north of the Wailuku River to Ka'ula Gulch, oftentimes characterized by its upright and densely vegetated cliffs and broad *kula* (plains) lands (Figure 16). The second *'okana* is Hilo One, or "sandy Hilo," famed for its black sand beach that extends along Hilo Bay between the Wailoa and Wailuku Rivers. The final *'okana* is Hilo Hanakahi, which extends south of Wailoa River to include Keaukaha (Edith Kanaka'ole Foundation 2012).

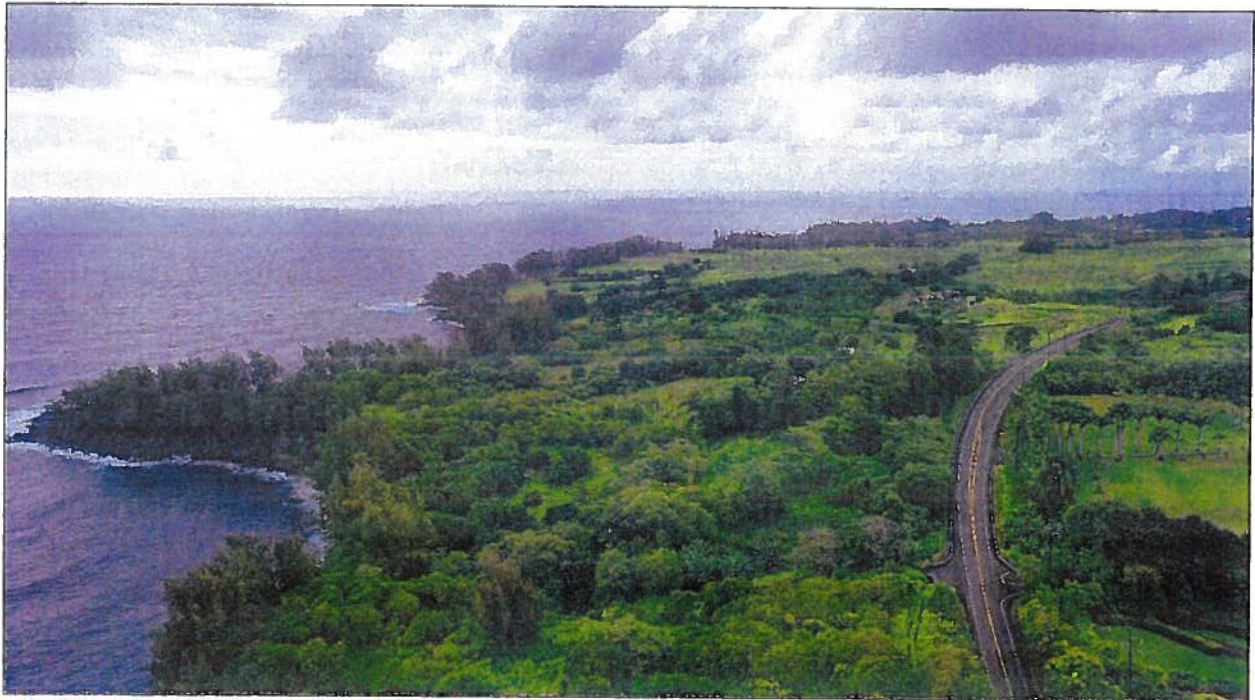


Figure 16. Aerial showing the landscape of Hilo Palikū with upright cliffs and expansive *kula* lands, view to the southeast.

Mālamalamaiki is located in the 'okana of Hilo Palikū. The abundance of streams, valleys, and gulches in this region made for a difficult and treacherous pass. In "Ka Huakaihele ike i na Makaainana o Hilo" (A Sightseeing Tour to Visit the Common Folk of Hilo), an account by G.K. Mahoe (1876) of his travels throughout Hilo that was serialized in the Hawaiian language newspaper *Ka Lahui Hawaii*, he describes Hilo Palikū as such:

...ua pale ae au i ka loa o ke alahale, ua manao ole ae hoi i na pali haultiuli o Hilo paliku, na piina, na ihona, na alu, na kahawai, na kualono, a me na pupu, ua hele hookahi ia no e a'u, me ka manao ole i ka luhi a me ka inea o ka hele ana, oiai, ma ka hoomaopopo ana i ka loa mai Hilo one a hiki i Laupahoehoe, me he mea la, ua aneane no i ke kanakolu mile. A mai kuhihewa hoi ka poe heluhelu, he papu a he laumania hoi ke ano o ka waiho ana o ka aina, aole, aka, he puu kinikini, he alu, he kapekepeke ke alanui.

...I am protected from the long path ahead, I did not think twice of the dark cliffs of Hilo Palikū, the inclines, the descents, the ravines, the streams, the mountaintops, and the cleared fields. I moved alone, without thinking much of the strain and discomfort of traveling, although, when I recalled the length between Hilo One and Laupāhoehoe, those thirty miles came and went. The reader should not be mistaken, the lands that are passed along the way are not clear and smooth, rather, there are many hills, gulches, and twisting roads. (Mahoe 1876:1)

King David Kalākaua also provided a concise description of this region's rough geography, but also includes a description regarding the density of the population there in his book *The Legends and Myths of Hawaii* (Kalākaua 1888):

The northeastern coast of the island of Hawaii presents an almost continuous succession of valleys, with intervening uplands rising gently for a few miles, and then more abruptly toward the snows of Mauna Kea and the clouds. The rains are abundant on that side of the island, and the fertile plateau, boldly fronting the sea with a line of cliffs from fifty to a hundred feet in height, is scored at intervals of one or two miles with deep almost impassable gulches, whose waters reach the ocean either through rocky channels worn to the level of the waves, or in cascades leaping from the cliffs and streaking the coast from Hilo to Waipio with lines that seem to be molten silver from the great crucible of Kilauea.

In the time of Liloa, and later, this plateau was thickly populated, and requiring no irrigation, was cultivated from the sea upward to the line of frost. A few kalo patches are still seen, and bananas grow, as of old, in secluded spots and along the banks of the ravines; but the broad acres are green with cane, and the whistle of the sugar-mill is heard above the roar of the surf that beats against the rock-bound front of Hamakua. (Kalākaua 1888:284)

Rain, Wind, and Place Names for Mālamalamaiki and the Greater Hilo Palikū

The *inoa* (names) of *wahi* (places), *ua* (rains), and *makani* (winds) within a particular *ahupua'a* or broader region evidences the long-term relationship of various communities to their immediate environment. Geographer Katrina-Ann R. Kapā'anaokālāokeola Nākoa Oliveira offers a concise description regarding the natural environment as it was understood by Native Hawaiians of the past:

Ancestral Kānaka recognized the connection between the heavens, lands, and oceans and how all three were interconnected and interdependent upon one another. In spite of the interwoven nature of the sky, land, and sea, however, Kānaka of ancestral times did not have a term that directly translates to what we have come to know today as "environment." Rather, the *Hawaiian Dictionary* offers two phrases that approximate the notion of environment: (1) "'ano o ka nohona" and (2) "nā mea e ho'opuni ana." 'Ano o ka nohona refers to the nature of one's relationship to one's surroundings or places. Nā mea e ho'opuni ana relates to everything that surrounds or encircles a person. (Oliveira 2014:64)

Reacquainting ourselves with these *inoa 'āina* (place names), *inoa ua* (rain names), and *inoa makani* (wind names) allow us to appreciate the environment as it was once observed by ancestral Hawaiian populations. In Mālamalamaiki and Lā'ini, a few *inoa 'āina* are listed by Soehren (2005) as markers for the boundaries of these *ahupua'a*. The *inoa 'āina* for Mālamalamaiki are listed in Table 1 below:

Table 1. *Inoa 'Āina* in Mālamalamaiki

<i>Inoa 'Āina</i>	<i>Notes</i>
Kaloa'awapuhi	Translated as "the many wild gingers." A place that served as a boundary marker between Mālamalamaiki and Lā'ini in the upper regions of the <i>ahupua'a</i> .
Kapo'alua	Translated as "the second night." A marshy area good for growing taro that was located at the boundary of Honomū, Lā'ini, and Mālamalamaiki.
Mana'onui	Translated as "important matter." A rock that marked the boundary between Mālamalamaiki and Honomū located on the northern bank of Honomū stream.
Mo'omo'ohualoa	Translated as "long-haired mo'o." A stream marking the boundary of Mālamalamaiki and Honomū.
Waihaka	Translated as "watery perch." A stream that served as a boundary marker between Honomū and Mālamalamaiki.

In terms of *inoa ua*, Hilo Palikū and the larger *moku* of Hilo is renowned in oral expressions such as *mele* (song), *oli* (chants), and *'ōlelo no 'eau* (proverbs and poetical expressions) for its abundance of rain and fresh water. Numerous *'ōlelo no 'eau* found in Pukui (1983) describe the characteristics of Hilo's many rains (Table 2).

Table 2. *'Ōlelo No'eau* associated with the famed rains of Hilo

<i>'Ōlelo No'eau</i>	<i>Literal/Figurative Translation</i>
<i>'Ele'ele Hilo, panopano i ka ua.</i>	Dark is Hilo, clouded with the rain (Pukui 1983:40)
<i>Halulu me he kapua'i kanaka la ka ua o Hilo.</i>	The rain of Hilo makes a rumbling sound like the treading of feet. (ibid.:53)
<i>Hana Hilo i ka po'i a ka ua.</i>	Hilo works on the lid of the rain. Refers to the constant showers typical of Hilo district on Hawai'i. (ibid.:54)
<i>Hilo 'āina ua lokuloku.</i>	Hilo of the pouring rain. (ibid.:107)
<i>Hilo i ka ua kinakinai, ka ua mao 'ole.</i>	Hilo of the constant rain, where it never clears up. (ibid.)
<i>'Au umauma o Hilo i ka wai.</i>	Hilo has breasted the water. To weather the storm. The district of Hilo had many gulches and streams and was difficult to cross. (ibid. 28)
<i>Pau ke aho i ke kahawai lau o Hilo.</i>	One's strength is exhausted in crossing the many streams of Hilo. Said of or by one who is weary with effort. First uttered by Hi'iaka in a chant when she found herself weary after a battle with the lizard god Pana'ewa. (ibid.:287)

Akana and Gonzalez (2015) in *Hānau Ka Ua*, a collection of Hawaiian rain names, describe the cultural significance of rain:

Our kūpuna [ancestors] had an intimate relationship with the elements. They were keen observers of their environment, with all of its life-giving and life-taking forces. They had a nuanced understanding of the rains of their home. They knew that one place could have several different rains, and that each rain was distinguishable from another. They knew when a particular rain would fall, its color, duration, intensity, the path it would take, the sound it made on the trees, the scent it carried, and the effect it had on people. (Akana and Gonzalez 2015:xv)

Listed in Table 3 are a few of the rain names associated with Hilo Palikū and the northern portion of Hilo that can be found in Akana and Gonzalez (2015):

Table 3. Rain Names Associated with Hilo Palikū

<i>Rain Name</i>	<i>Literai/Figurative Translation</i>
'Awa'awa	Translates as "bitter." Refers to a cold and dark rain or mist.
He'enehu	Translates as "sliding anchovy." Refers to a misty rain in the early morning off the coastline at a time when nelu fish are in abundance.
Ho'olua	Translates as "to do twice." Refers to heavy rains that fall during strong northerly winds (which are also known as ho'olua).
Kinai	Translates as "to quench or extinguish." Refers to a constant rain that continues for long hours.
Kualua	Translates as "repeating twice." Refers to rain over the sea that is accompanied by wind.
Lanipili	Translates as "clinging sky." Refers to cloudbursts or heavy rain that lasts for days.
Lanipōlua	Translates as "very dark sky." Refers to misty rain that falls when forests are obscured by low-lying clouds.
Lauhīnāno	Translates as "bracts of the hīnāno flower." Refers to a rain associated with the area of Honomū.
Lokuloku	Translates as "pouring rain." A generic term referring to heavy showers accompanied by wind. (Lila 1872:3)
Nāulu	Translated as "vexed." Refers to sudden heavy showers.
Uluṃano	Translated as "growing exponentially." A rain that travels inland from the sea that is an indicator of the abundance of 'ōhua (juvenile fish).

Of the rains that are listed, the Nāulu is explicitly associated with Hilo Palikū, as expressed in a *mele kū'auhau*, or genealogical chant, written for Queen Emma Kaleleōnālani:

Hāne 'e mai Liloa me he Uluauunui lā Liloa sags like an Uluauunui lā
Me he kuāua Nāulu nui i pano Hilo Pali Kū Like a heavy Nāulu shower that obscured Hilo Pali Kū.
 (Nogelmeier in Akana and Gonzalez 2015:187)

Whereas *Hānau Ka Ua* provides us with a comprehensive listing of *inoa ua* across the Hawaiian Islands, there is no comparable publication for *inoa makani* to date. Listed in Table 4 are wind names that can be found in an array of Hawaiian and English language primary sources:

Table 4. Wind Names Associated with Hilo Palikū

<i>Wind Name</i>	<i>Notes</i>
'A'alāhonua	Translates as "fragrant earth." A wind that carries the fragrance of soil and foliage after the rain. (Alvarado 2005)
Kēpia	Translates as "dandruff." A wind associated with Hilo Palikū. (Nawaa 1904)
Kolonahe	Translates as "crawling slowly." A generic term for a gentle breeze (Lila 1872).
Uluauunui	Translates as "to grow increasingly." a strong northerly wind that makes landing by boat difficult.
Uluau	Translates as "to grow increasingly." Associated with Hilo Palikū in the <i>mo'olelo</i> of Kuapaka'a. (Kuapuu 1861:24)
Ho'olua	Translates as "to do twice." Refers to strong northerly winds that may include rain. (Malo 1903:35)
Hau	Translates as "ice." A wind that blows downward from the mountains (Malo 1903:35)
Māluaki'iwai	"Translate as "water-collecting seabreeze." A sea breeze accompanied by showers. (Alvarado 2005:5).

Mele (songs) are valuable sources of information for the *inoa* 'āina, *inoa ua*, and *inoa makani* of particular areas that were published frequently in Hawaiian language newspapers and in other primary sources. A *mele inoa* (honorific song in honor of a person) was published in the O'ahu-based Hawaiian language newspaper *Ka Nupepa Kuokoa* on February 17, 1872. The *mele inoa* was penned on February 5 and was written for a woman named Kaiewe, the eldest child of B. Kuhea, by multiple relatives and family friends living in Kūhūa (the *ahupua'a* immediately north of Honomū). A verse written by a woman named Lila honors Kaiewe and lists adjacent *ahupua'a* such as La'imi and Ka'akepa in the *mele inoa*. Although the original text does not include diacritics, *kahakō* (macrons to elongate vowels) and 'okina (glottal stops) are included to conform to modern Hawaiian orthography and to aid in translating the text. Wind, rain, and place names are bolded for emphasis:

<i>A uka au o 'Akaka</i>	I am in the uplands of 'Akaka
<i>Ha'a na ka lehua i ka wai</i>	The lehua blossoms droop from the abundance of water
<i>'O ka ne'e a ka ua lokuloku</i>	The lokuloku rains inch along
<i>Wala'au i ka lau lā'au</i>	There is chattering in the forest
<i>Hone ana ka leo o ka manu</i>	The sweet sound of birds
<i>Ka'i'i 'ana i ka nāhele</i>	Shrilling in the forest
<i>'O ka hele ala ka ma'eu</i>	Traveling afar are these sounds
<i>Ka'ulua 'ole iho ka mana'o</i>	My thoughts are not remiss
<i>Pilipili 'āina 'ole mai</i>	They do not come near the land
<i>Iluna au o Hale Rose</i>	I am above Hale Rose
<i>Ho'olohe i ke kani o ka pio</i>	Listening to the sound of chirps
<i>Akahi no a olu pono mai</i>	Never before have I been pleasantly comforted
<i>Ka manao lanili i ka hoa</i>	By these circuitous thoughts of a companion
<i>Me oe ke aloha pau ole</i>	With you is my endless love
<i>O Kaiewe no he inoa</i>	Indeed, Kaiewe is your name
<i>A luna au o Lā'imi</i>	I am in the uplands of Lā'imi
<i>'O ka waiho a'e a Ka'akepa</i>	Left in Ka'akepa
<i>'Ike i ka lau o ke kō</i>	I see the leaves of the sugarcane
<i>'O ka welo a ka Hae Hawai'i</i>	The waving fluttering of the Hawaiian flag
<i>Ua pulu i ka ua lili'i</i>	Moistened by scattered showers
<i>Ia hona i ka mālualua</i>	Fortunate to feel the mālualua wind
<i>I ka pā kolonahe ma kai</i>	Gently blowing by the ocean
<i>A kai au o ke Awaiki</i>	I head seaward to Awaiki
<i>Hāliu au nānā iā uka</i>	I turn my attentions towards the uplands
<i>'O ka holu a ka lau 'Inia,</i>	The Pride-of-India (Chinaberry) leaves sway
<i>'I'ini aku ana ka mana'o</i>	My thoughts desire
<i>E 'ike i ka hoa i ka 'ili</i>	To see my close friend
<i>Me 'oe ke aloha pau 'ole</i>	With you is my endless love
<i>'O Kaiewe no he inoa</i>	Indeed, Kaiewe is your name (Lila 1872:3)

Traditional Accounts of Mālamalamaiki Ahupua'a and the Greater Hilo Palikū

Mo'olelo (accounts) and *mele* (songs) offer rich resources for understanding the cultural landscape, land use, and practices of an area. In addition to *inoa* 'āina (place names), *inoa ua* (rain names), and *inoa makani* (wind names), they are another source of history that informs our understanding of how peoples of the past expressed their relationships to their lands and environment. An exhaustive search through published resources and historical Hawaiian language newspapers resulted in no *mo'olelo* or *mele* that directly named the *ahupua'a* of Mālamalamaiki. However, there is an array of *mo'olelo* that speak of events that take place in the 'okana of Hilo Palikū and in the general Honomū area.

The Story of Kuahailo and Hinaaukekele

He Moolelo Kaa no Kuahailo a me Hinaaukekele, Kana Kaikamahine Hanaina (An account for Kuahailo and Hinaaukekele, his female relative) is a story that recounts the establishment of the highest-ranking genealogical lines of Hawai'i. Published as a weekly serial in the Hilo-based Hawaiian language newspaper *Ka Hoku o Hawai'i* from July 18, 1918, to March 13, 1919, the *mo'olelo* follows Kuahailo and Hinaaukekele along their journey from their ancestral home of Kuaihelani to the various islands of Hawai'i.

The segment of the *mo'olelo* in Hilo Palikū takes place midway through the narrative and were published in installments between January 30, 1919, and February 27, 1919. At this point in the *mo'olelo*, Hinaaukekele and her husband, Kahikikuaokalani, resided in the valley of Waipi'o. Their journey to Hilo Palikū began with a dialogue between Hinaaukekele and Kahikikuaokalani, where she expressed her desire to visit her grandmother, Hailikulamanu, and other relatives who lived in the 'okana of Hilo Hanakahi. Kahikikuaokalani agreed with Hinaaukekele to visit their relatives. They made their way to Hilo Hanakahi atop a traveling 'ōhi'a tree filled with *lehua* blossoms. According to the *mo'olelo*, the tree grew out of Hinaaukekele's 'iwe (placenta, afterbirth) that her mother, Hinauluohia, planted near their home in Paliuli.

As the couple traveled to Hilo Hanakahi, Kahikikuaokalani heard the yelling and cheering of many people coming from the valley of Laupāhoehoe. He asked Hinaaukekele to instruct her traveling 'ōhi'a tree to stop where all the commotion was coming from. In his curiosity, Kahikikuaokalani searched out the source of the cheering. He discovered that the noise was of bystanders who were cheering on two exceptionally skilled surfers, one from Hilo One and one from Hilo Palikū, who were competing against each other. The waves at Laupāhoehoe were well known across Hawai'i Island and were the same waves that were favored by the famed *ali'i*, 'Umi, generations later.

When Hinaaukekele and Kahikikuaokalani arrived, the people of Laupāhoehoe shifted their attention away from the surfers and rushed towards the beautiful travelers atop the moving 'ōhi'a tree. What made these travelers even more extraordinary was the fact that they were accompanied by numerous forest-dwelling birds and four low-lying rainbows. When Hinaaukekele inquired about the commotion, some spectators responded that they were celebrating the fact that their surfer, a Hilo Palikū man by the name of Kekuaiwa, beat Kenao, the surfer from Hilo One, and won forty *kapa* cloths and a long canoe in the process. When Hinaaukekele asked how Kekuaiwa won, the people responded that it was because he was more skilled at surfing in the rough waters of Laupāhoehoe as opposed to the calmer waters of Hilo One. Furthermore, Hinaaukekele inquired about the ruling chief of the area, in which the people of Laupāhoehoe responded that there was no ruling chief who lived in the valley but that they were subjects of Kanakea, a chiefess who resided in Hilo. Kanakea knew of Hinaaukekele, as she was the one who was sent to retrieve Kahikikuaokalani from O'ahu.

Hinaaukekele then proceeded to tell the people of Laupāhoehoe to have the two surfers compete once more. The spectators enthusiastically followed these instructions and told the local *konohiki* (head man of an *ahupua'a*) what they heard from these distinguished travelers. In turn, the *konohiki* told the surfers to take to the waves again, and the surfers agreed without complaint.

When Kekuaiwa and Kenao reached the wave break, both were intent on outdoing their competitor to become the champion of the waves. Kekuaiwa did not think twice about Kenao, for he surfed in the waters of Laupāhoehoe since he was a child. As a wave neared, Kenao paddled to a spot where the waves were easier to ride. Kekuaiwa knew what Kenao was doing and prepared himself for the competition ahead. Onshore, the majority of spectators believed that Kekuaiwa would win once more since he won the first time.

Enthused by the energy of the crowd and surfers, Kahikikuaokalani proposed to Hinaaukekele that they pick who they believed would win the surf competition. When Kahikikuaokalani told Hinaaukekele that she could pick first, she laughed, teasing him by saying that he only wanted her to choose Kekuaiwa, the obvious choice since he won the first competition, because he could rebuke her for choosing the former winner. Kahikikuaokalani laughed at Hinaaukekele's remarks and told his beloved that he was letting her choose first as a gesture of honor and respect and that either of the surfers could win.

When the couple looked down at the surfers who were poised to catch the next wave, Hinaaukele used her thoughts to secretly call her magical grandmother to let the surfer from Hilo One win the competition. When an excellent surfing wave neared, the two surfers caught it. They both rode splendidly. As they neared the shore, it was clear that the surfer from Hilo Palikū, Kekuaiwa, would win the competition. But as they neared the shore, Kekuaiwa saw a human hand emerge from the sea and snatched his board down into the depths. Kenao was thus the winner of the second round.

The spectators ashore were shocked to the point of speechlessness due to the outcome of the surfing competition. They could not explain how Kekuaiwa lost to Kenao. So too was Kahikikuaokalani puzzled by this turn of events, as he had no way of knowing that it was Hailikulamanu, Hinaaukekele's grandmother, who intervened. When the surfers came back to land, Hinaaukekele instructed someone to tell the surfers to come to her and Kahikikuaokalani. Kenao happily obliged to this request, but Kekuaiwa was furious about his loss and did not want to see these visitors out of embarrassment.

Kahikikuaokalani was still pondering the outcome of the competition. He realized in time that Hinaaukekele must have had something to do with Kenao's win, so he asked Hinaaukekele if he could leave and find Kekuaiwa, which

she allowed him to do so. When he found Kekuaiwa, Kahikikuaokalani explained that it was because of Hinaaukekele's magical abilities that resulted in his loss during the surfing competition. Kekuaiwa then described how a human hand grabbed his board and pulled him down. In response, Kahikikuaokalani explained to Kekuaiwa that he had nothing to be ashamed of because it was his decision to bet against Hinaaukekele that resulted in his (Kekuaiwa's) loss. Kahikikuaokalani continued by describing how Hinaaukekele used her thoughts to call out to her grandmother to assist Kenao in winning the competition.

When Kahikikuaokalani returned to Hinaaukekele, she laughed because she knew that her secret was exposed. She turned to Kenao and asked him if he wanted to accompany them to Hilo One, in which he humbly declined due to their superior rank. From there Hinaaukekele and Kahikikuaokalani continued on their journey through Hilo Palikū until they reached Hilo One.

Ke Ka'ao Ho'oniua Pu'uwai no Ka-miki- The Heart Stirring Story of Ka-Miki

Although no *mo'olelo* were found that explicitly name Mālamalaiki or Lā'imi, the adjacent *ahupua'a* of Kuhua and Honomū are named frequently. One such account of these lands concerns an *'ōlohe* (skilled fighter/competitor) named Kuhua-i-Hālala in *Ke Ka'ao Ho'oniua Pu'uwai no Ka-miki* (The Heart Stirring Story of Ka-Miki), another serialized *mo'olelo* published in *Ka Hoku o Hawaii* between 1914 and 1917. *Ka-Miki* was likely authored during the late 1800s through the early 1900s by noted Hawaiian scholars John Wise and J.W.H.I. Kihe. Although the account is not one that is considered to be from time immemorial, Maly (1997), who translated the *mo'olelo* from Hawaiian into English, states that following regarding the value of the information contained therein:

...the authors used a mixture of local legends, tales, and family traditions in association with place names to tie together fragments of site specific stories that had been handed down over the generations. Thus, while in many cases, the personification of individuals and their associated place names may not be "ancient," the site documentation within the "story of Ka-miki" is of both cultural and historical value. (Maly 1997:5)

The *mo'olelo* of Ka-Miki tells of two supernatural brothers, Ka-Miki and Maka'iole, who were skilled *'ōlohe*. They traveled around Hawai'i Island by way of the ancient trails and paths (*ala loa* and *ala hele*) and sought to compete with other *'ōlohe*. Ka-Miki and Maka'iole were born to Pōhaku-o-Kāne (male) and Kapa'ilhilani (female), who were the *ali'i* of the lands of Kohana-iki and Kaloko in North Kona. Upon the mysterious and premature birth of Ka-miki, he was placed in the cave of Pōnahanaha and given up for dead. He was eventually saved and raised by his ancestress, Ka-uluhe-nui-hihi-kolo-i-uka, a manifestation of the goddess Haumea, at Kalama'ula, an area located on Hualālai. Ka-miki was later joined by his elder brother Maka'iole where their ancestress Ka-uluhe-nui trained her grandsons into *'ōlohe*, or experts skilled in fighting, wrestling, debating, riddle solving, and running, and how to use their supernatural power.

The portion of the *mo'olelo* set in the Kuhua-Kolekole area was published in *Ka Hoku o Hawaii* between May 24, 1916, to July 27, 1916. Through this account, we learn that Kuhua was so named in honor of an *'ōlohe* chiefess, Kuhua-i-Hālala, daughter of Honomū and sister of 'Ōpe'a-i-Honohina. Similarly, Kolekole was also named after the chief Kolekole and was an area famed as a *lua* (Hawaiian martial arts) contest grounds.

The *mo'olelo* begins along the *ala loa* in the *kula* regions, overlooking the infamous cliffs of Hilo Palikū. While there, Ka-Miki and Maka'iole along with their companions, the chiefs named Hilo Hanakahi and Keahialaka, were attacked by Kapāhe'ehe'e and Honomū. Ka-Miki and Maka'iole successfully warded off their attackers and restrained them, leaving them stranded along the trailside. A short distance away, they met Kuhua-i-Hālala, guardian of Kapāhe'ehe'e and daughter of Honomū.

Kuhua-i-Hālala was an *'ōlohe* skilled in the art of *ha'iha'i* (bone-breaking) and *lua* (hand-to-hand combat). Like Honomū and Kapāhe'ehe'e, she oftentimes challenged travelers along the *ala loa* when they neared her residence. If the travelers were successful in protecting themselves, she would lure them into her home, purportedly overlooking the cliff ledge of Kūpoupo'o, and strangled her victims to death using her *'aha puluniu* (sennit crab snare).

When Kuhua-i-Hālala encountered Ka-Miki and Maka'iole, she posed to him a riddle: "Can one move swiftly through Hilo?" To which they replied, "Yes indeed one may travel swiftly through Hilo, for there is no water in the streams!" Ka-Miki's rebuttal was an insult, implying that there were no *'ōlohe* on the trail that could stop them from continuing on their journey (Maly 1994:6). Kuhua-i-Hālala, intrigued by their response, replied thusly:

How is it that Hilo is without water ('ōlohe)? There are many (400) hills, many (4,000) descents, and many (40,000) rivers in Hilo, one becomes breathless (is overcome) swimming in the waters of Hilo, but one is never out of water in Hilo...Hilo is the land of rain, rain that goes on and on, rain that darkens the sun. Indeed the sun is darkened by the rains, and it is the Māluaki'iwai that pushed

down the river debris (travelers) from the uplands. So is the stormy nature of Hilo known, and blocked are the trails that one would travel. (Maly 1994:6)

Ka-Miki replied to Kuhua-i-Hālala in a poetic-riddle form:

Hilo has no water. The water has returned and sits in the springs, along the dripping cliff faces, to the quiet pools. The rivers have receded, the rain trough of Hilo is placed in the heavens...we have come to see Hilo bound in the meshes of heavenly rains. Hilo in the long twined lines of the Mālualua, which fetches the multitudinous waters ('ōlohe), those of skill, [wind] upon the mountain tops [adorned] with budding 'ōhi'a, and the māmane that droops in the cold, on the mountains that move overhead like birds soaring in the heights of the heavens. Hilo is consumed by the great wind of the gourd; now it is like a small gourd to be set aside, the children call out; for it is ended. Hilo is [no longer] black, darkened by the rains. [emptied] are the rain troughs in the heavens... (Maly 1994:7)

In this passage, Ka-Miki cleverly referenced the many waters, streams, rains, and storms of Hilo that described the 'ōlohe who tormented the people within the region. The winds Ka-Miki spoke of, referred to how he and his men cleared the heavens, thereby giving way for the people of Hilo to celebrate and feel safe in their homeland once again. Ka-Miki with an ingenious retort told Kuhua-i-Hālala:

It is I, the descendent of *Ka-uluhe-nui-hihi-kolo-i-uka*, who have cleansed and dried the rivers. Hereafter the debris ('ōlohe) that has blocked the pathways will never again rise. *Nana-i-ke-kihi-o-Kamalama*, the descendent of *Lani-nui-ku'i-a-mamao-loa* has ended the practices of Upeloa, Kaūmana, Kalanakama'a-o-uli, Pūkihāe, Mokuhonua, Waiaea, Kaiwiki, Honoli'i, Kīko'oakapuna, Pau and Keka'a [Pauka'a], Pucopākū, Pāpa'i-nui-a-kou [Pāpa'ikou], Waiāhole Ka'ie'ie-lulu-ka-i'a [Ka'ie'ie], Kalaoa, Hanawī, Kula'imano, Kukuilauania, Kapāhe'ehe'e, and Honomū—for all have been bound by Ka-Miki. Thus Ka-Miki has waded through half of the streams of Hilo, and here is Ka-Miki seeking out and judging the skilled 'ōlohe who remain, seeking the *koa* trees that darken [i.e. disreputable warriors] all the forests. (Seeking) the great *koa* and little *koa*, those who are called the *Koa pā'ele-kū o Hilo*—*Koa* trees that darken Hilo [high canopy trees that shade all that is below; descriptive of powerful warriors]. (Maly 1994:7)

After hearing these taunts, Kuhua-i-Hālala realized that Ka-Miki and his group deliberately sought after her. Incensed by their confidence, Kuhua-i-Hālala lunged forward and attacked them. However, she failed and was ensnared in the net of Lani-nui-ku'i-a-mamao-loa. She then surrendered and agreed to no longer ambush any more travelers. Upon her release, she took the two travelers to meet Hū'ia, a master carver, and skilled orator, from Kolekole who questioned their visit to their village. Kuhua-i-Hālala told Hū'ia and the people of Kolekole about Ka-Miki and his victory over her and that no one was capable of beating him, not even Hakalau-nui, a priest of the area.

Ka-Miki quickly noticed the many magnificent carved images in the village of Kolekole. In his admiration for the carvings, Ka-Miki complimented Hū'ia for his work, to which Ka-Miki was met with much arrogance. Hū'ia challenged Ka-Miki by stating that Kūlanikapele and Kolekole finest champions could defeat him. Ka-Miki quickly learned that Kolekole was the grounds where many contests were held and therefore, requested to meet with the area champions on the contest field.

In preparation for the contest, Ka-Miki uttered a chant, calling to his ancestors. From the mountains, a mysterious voice replied to him. Hū'ia heard this voice and became terrified and hurried to the home of Kūlanikapele, a chief, 'ōlohe, and advisor to Kolekole. He told Kūlanikapele of Ka-Miki and the unusual occurrences he witnessed. In response, Kūlanikapele sent the messenger 'Ōhi'aokalani to confirm the what Honomū, Kuhua-i-Hālala, and Kapāhe'ehe'e had experienced at the hands of Ka-Miki and Maka'Iole, which to his dismay, was true. Kūlanikapele sent 'Ōhi'aokalani out again, but this time, to retrieve his grandson, Akaka, another skilled competitor in the contest games. After much discussion, Kūlanikapele and Akaka agreed that they were outmatched by Ka-Miki and instead arranged for him a feast and 'awa ceremony. Meanwhile, at the *kahua* (contest field) in Kolekole, the people of the area gathered and Akaka escorted Ka-Miki to the field to spectate and observe the contest.

Kuhua-i-Hālala was the first contestant arranged to compete against Waile'ale'a, a famous 'ōlohe from Maui. But since Kuhua-i-Hālala had surrendered to Ka-Miki, she claimed that he must fight him instead. Ka-Miki, never one to back down from a challenge, met Waile'ale'a on the *kahua* and with great skill and speed, flung Waile'ale'a off the platform. Following his victory, Ka-Miki called out for his next opponent but to his surprise, Waile'ale'a requested a rematch. Ka-Miki teased Waile'ale'a of his prior defeat and the great humiliation he would be subjected to if he challenged him a second time. This enraged Waile'ale'a and without hesitation, he stomped onto the *kahua* to try his

hand again at defeating Ka-Miki. To his displeasure, he was thrown from the *kahua* in the same manner as before to which he accepted his defeat and realized he was no match for Ka-Miki.

Following Ka-Miki's victory over Waile'ale'a, another contender named Hakalau-nui entered the *kahua* to compete. Ka-Miki exchanged banter with him, boasting of their abilities and skills to each other. When the contest began, Hakalau-nui attempted to seize Ka-Miki, but instead, found himself trapped by Ka-Miki's *malo* (loincloth). Unable to free himself, Hakalau-nui was defeated by Ka-Miki, who then proceeded to call for a new opponent. Kama'e'e-a-kau answered and stepped on to the *kahua* ready to challenge Ka-Miki, and like those before him, he would not be victorious. In an attempt to avenge these defeats, eleven 'ōlohe rallied together to defeat Ka-Miki. However, they were unsuccessful and were left bound by Ka-Miki until the next day. Hū'ia, humbled by the outcome, asked for forgiveness from Ka-Miki and was then made the *konohiki* of Kolekole. He cared for the *lo'i* (taro) terraces, 'uala (sweet potato) gardens and sugar cane, banana and 'awa plantings that grew along the cliffs of 'Akaka.

Kolekole, having been impressed by Ka-Miki and defeating all the 'ōlohe of Hilo Palikū, prepared a grand feast and 'awa ceremony for Ka-Miki and his friends. Following the ceremony, they continued their journey to meet with Maulua-a-pi'o, a friend of Hilo Hanakahi who shared with Maulua-a-pi'o all the feats that Ka-Miki had accomplished and asked for his friend to not challenge Ka-Miki (Maly 1994).

Ka hele malihini ana i Hilo Palikū a me 'Akaka -Sightseeing tours of Hilo Palikū and 'Akaka

In the past (and still today), the legendary waterfall of 'Akaka was an attraction that *malihini* (visitors) always visited as they traversed through the plains and valleys of Hilo Palikū. 'Akaka is located in Kuhua, an *ahupua'a* north of Honomū and Mālamalamaiki. Such a famed site would have been known by native residents of Mālamalamaiki and is part of the cultural heritage of this area within Hilo Palikū. Below are two native accounts of visits to 'Akaka that speak of the splendors of their hike to the waterfalls. The names of places and famed trees that once grew there are mentioned. Descriptions of the natural environment surrounding 'Akaka reveal an abundant landscape of native birds and trees.

The earlier of the two accounts was written by Z. Poli, a Hawaiian reverend who wrote of his travels across Hawai'i Island to visit congregation members in a serialized story titled "*Ka Hele Malihini ana ia Hawaii a me na Mea Hoi i ike ia*" (Traveling to Hawaii and the many new things that were seen). Poli's account was published in 1867 in the newspaper *Ka Nupepa Kuokoa*. In the October 5th edition of "*Ka Hele Malihini ana*," Poli described his travels from Hilo to Waimea. On August 26, 1867, he acquired two horses, one for him and one for his child, from J. L. Kuahau and began his journey through Hilo Palikū. Kuahau and another man named Keo accompanied Poli to Hakalau where he met Reverend T. Pohano. At the beginning of his account, he described the numerous cliffs of the region:

...aia a ike mai i na iho ana kawahawaha, a me na piina piiku, e hualalahu ana i o a ia nei, a i iho la au ia'u iho, pau io kuhihewa i na pali o Hilo, aohe io no o ka pali a pali, makena, weliweli ka nui o ua mea he pali o nei aina, he i hoi ka'u o Kauai ka aina pali, eia ka aole, o Hilopaliku nei ka ka oi o ka pali. (Poli 1867:4)

...as I saw the many uneven descending paths, as well as the many steep ascending paths, going up and down here and there, and once I descended. I was never mistaken again about the cliffs of Hilo, there are no cliffs like these cliffs, (there are) many, most of the cliffs of these lands are treacherous. I thought completely that Kaua'i was the land of cliffs, but no, Hilopaliku indeed has incredible cliffs.

Along their path, Kuahau and Keo generously shared many stories about the famed places of Hilo Palikū, in which Poli was most appreciative. He listed some of the *mo'olelo* and *wahi pana* (storied places) that he heard from them:

A ua oluolu lia laua i ka hoikeike a me ke kuhikuhi pono ana mai ia'u i na wahi pana o ua Hilopaliku nei, a ike iho la au ia mau kanaka kaulana ma ke Kaao o Keanianiulaokalani, i ka hoe waa, o Kumunuiake, a me Moanonuikalehua, e ku ana i kahawai, he mau pohaku ala no elua e waiho nemonemo ana ma ka lihi makai pono o ke alanui iwaennakonu o ke kahawai, a o ke alanui no ia e au aku ai ma kela kapa. A pela mai no he wahi ana i kapaia o Kanikuekue, no ke kani kuekue ana o ka la Kuku Paupau a kekahi wahi luahine o na kau i hala, ke kumu i kapaia'i "Kanikuekue" a ua ikepono au i keia wahi pana inoio o ua Hilopaliku nei. (Poli 1867:4)

They both generously showed me where that many storied places of Hilo Palikū were, and I saw the famed characters of the account of **Keanianiulaokalani**, of the canoe, **Kumunuiake**, and **Moanonuikalehua**, standing in the stream, which are two smooth rocks in the middle of the stream along the seaward side of the road, a road that requires you to swim to the other side. It is also there that a cave named **Kanikuekue** is located,

due to the sound of tapping tapa beaters of an old woman in days gone by, and the reason why that place bears the name "Kanikuckue," and I indeed saw that tempestuous place of Hilo Palikū.

In the late afternoon, Poli, his child, Kuahau, and Keo, arrived in Kuhua Ahupua'a and began their ascent to 'Akaka. He described their path as one that went through *uluhe* (*Dicranopteris linearis*) bushes and verdant forests. Once they arrived at the waterfall, the upper forests were quickly covered in mist and they were caught in heavy rains and winds. As they endured the rains, Poli was reminded of something that he heard while he was in Hilo. The excerpt remains in quotes as Poli is quoting another person:

"He pilikia pinepine ka na malihini hele makaikai i ka Waialele o Akaka, i ka make i ka opili a ka ua, ke ako ake uhai paha i na Lehua a Pane i ka nuku o ka Waialele, a uhai iho iluna o ka pohaku a Pele, o ka manawa ia poele mai la ka lani i ka ua, a uhi paapu mai la ka ohu, a me ka noe i ke kuahiwi, a ike ole ia 'ku kahi a me kahi, e La malie wale no ka la, e hele ana a ka lae ka lani, ike wahi ao ole ia 'ku, a kolohe no e kolohe ka malihini i ua mau lehua nei, o ka manawa iho la no ia e hana 'i ka ua i kana hana, a make i ka opili, wahi mai a kuu loke [sic.] i kai o Hilo-one, a ua papaia mai au me ia malihini hele makaikai i ka waialele o Akaka, aohe make kolohe, aohe make ako i na Lehua a Pane, mai uhai oe i ka lehua a Pane iluna o ka pohaku a Pele, o pulu io auanei oukou i ka ua, a pela iho la kuu noke ia ana mai i ka papa i ka o Hilo, a o ka hele maluhia wale no ka pono a hiki i ka ikemaka ana ia Akaka." (Poli 1867:4)

Visitors who hike to 'Akaka Falls frequently experience problems, dying from the numbing cold rains. When they pluck and break the Lehua of Pane at the edge of the waterfall, and stack them atop the stone of Pele, that is the when the skies darken with rain, the fog envelops everything, and the mists shroud the mountaintops, to the point where you can't see the person next to you. It could be a pleasant day, the weather perfect on your travels, but if you are unaware, and do mischievous things with those *lehua* like most mischievous travelers do, that is when the rain will do what it does, and [you] die from the cold, according to my lover in Hilo-one, and I was forbidden from visiting 'Akaka Falls, [I] would not die a dishonest death. [I] would not die from picking the lehua of Pane, do not leave the lehua of Pane atop the stone of Pele, lest you be drenched in the rain, and that is why I am persistently told by those of Hilo to not go, and that you should only travel safely to see 'Akaka."

When Poli heard this account, he was skeptical and was determined to pick the *lehua* of Pane and to place it upon the rock of Pele to demonstrate that these beliefs were not real (*lapuwale*). After they reached the falls, Poli described the sense of awe that they felt because of its height and the beauty that surrounded it. Poli described the flow of the waters off the edge of the cliffside and down into the pools below where they made their way to Kolekole Stream. He then detailed his actions at the edge of the waterfall, which included an account behind the name of 'Akaka:

A penei ka 'u hana:--O na Lehua a Pane, he mau lehua kapu ia, aia lakou e kakau nui ana i ka nuku pono o Akaka. (A o Akaka hoi, he wahi kanaka ui no ia ma kona moolelo, a mamuli o ke kena ana a kona Kupunawahine e hiahia ahi, a o kona hana no ia, a ia ia e noke ana i ka hia ahi, holo aku la ka hohono a i ka ihu o kana mau ipo e pii mai ana e moe me ua o Akaka, mai kai mai, a ike kekahi makamaka ona i ka honi ana mai o kana mau ipo, o kona hele no ia a hai aku la ia Akaka me ka i aku ia ia, --"E, pii mai nei au mau ipo a honi mai nei i ka hohono o ke ahi, a hoowahawaha ia oe."--a ia ia i lohe ai i keia, o kona lele no ia iloko o ka wai, a make loa, a kapaia iho la ua wahi nei, o Akaka, mamuli o Akaka.)

A lawe mai la au hookahi kumulehua, a hahau iho la elua hahau ana i ka pohaku pono o ka ihu o ua o Akaka, a mahope iho, eha a 'u hahau ana iluna o ka pohaku a Pele, me ke kanalua ole, a makau ole mai, no ke kolohe ana i keia mau mea i papa ia mai ai no keia wahi, a hookahi mea i koe mahope iho, o ke kali ana 'ku i ka hana mai a ka ua nui i kana hana, o ka hoopulu mai ia makou, no kuu kolohe ana i na mea kapu i papaia, a ke hai aku nei au, me ke akaka loa, aohe makou i pulu iki i ka ua a hiki i kauhale. O ka pulu wale no i loa a ka pii ana mai; oia wale iho la no, a nolaila hoi, ke hoike aku nei ai i na malihini hele makaikai a pau ia Akaka, mai hilinai i na mea i hookapu ia... (Poli 1867:4)

And this is what I did: Regarding the lehua of Pane, they are sacred *lehua*, growing near the edge of 'Akaka. (As for 'Akaka, [the name] derives from a story about a beautiful man, who was instructed by his grandmother to start a fire, which he indeed tried to do, and as he was making his fire, his lovers would smell the scent [of the smoke] and travel from the coast to where he was to have sex

with 'Akaka. One of 'Akaka's acquaintances saw his lovers smelling [the smoke]. He (the acquaintance) went to 'Akaka and told him "eh, your lovers are coming up here when they smell the smoke from the fire, and some folks are fed up with you." Once he heard this, 'Akaka jumped off the waterfall and died, and that is why that place is called 'Akaka, because of the man 'Akaka.) Then, I brought one a *lehua* (*Metrosideros polymorpha*) branch, and struck it twice against the rock at the tip of 'Akaka, and afterwards, I struck the rock of Pele four times, without hesitation, and with no fear because of my skepticism behind this forbidden act at this place, and another thing, I waited for the pouring rain to do its work, to make us soaked for doing what I was not supposed to, and I am telling you in all honesty, we did not get soaked all the way home. We only got wet when we hiked to 'Akaka. That is the only time, and thus, I am showing all visitors to 'Akaka that they should not believe in this superstition.

Following his visit to 'Akaka, Poli continued on his journey to Waimea. His account is of interest because he shares the names of storied places across Hilo Palikū even though he is skeptical of Hawaiian beliefs. Although Poli is dismissive of these beliefs, we are fortunate that he wrote about them during his journey for readers in the past and the present. Poli's account is enriched by another trip made by J.M. Keliwaiwaiole of the Honomū Sugar Company in 1885. In an article he authored titled "*Ike I na Pali Hookui o Akaka Fall*" (Seeing the Twin Cliffs of 'Akaka Falls), published in *Ko Hawaii Pae Aina* on September 5, Keliwaiwaiole describes his pleasant trip to Akaka, noting the things in the natural environment that caught his attention. He described the thick vegetation (*hihipe'a*) of the forest and the sounds of forest birds like 'apapane and 'i'iwi, and noted how these sights brought joy to their trip. At around 10 in the morning Keliwaiwaiole reached the falls. He peered over the edge of 'Akaka and saw the numerous ferns and gingers growing in the misty environment. Like Poli, Keliwaiwaiole spoke of the famed *Lehua* of Pane in his account. However, Keliwaiwaiole named more famed trees and rocks that can be found atop 'Akaka falls:

A ma ka hoike mai a ke kamaaina i na mea kaulana o ua wahi nei, oia iho keia. He mau kumu lehua nenee i ka pahoehoe ma ka akau a ma ka hema o na wai lele nei, o ko laua mau inoa, o na lehua a Pane a me na lehua a Ehu, a o keia ka na wehi o na keiki nei. A he pohaku nui hoi ma uka aku, o pohaku o Kaloa ia, oia ka makuakane, a he wai poepoe hoi mauka aku, o Kulanikapele ia oia ka makuahine, a he kumu ohia nui e pili ana i ka pali ma ka aoao akau, o Ohiaokalani ia oia ke kupunakane, a he heiau no hoi ia wahi no na 'Ii o ka wa kahiko, he ohuku pali hoi e haawe mai ana ma ka aoao komohana, o Laeolono ia oia ke kupunawahine o ua keiki nei, a he mau wahi wai liilii e lele mai ana ma ka aoao a me ka hema, o ko lakou mau inoa oia o Ukuula, Hualei a me Ahaa, he mau wahine lawelawe ka ia no ua keiki nei. He nui aku na moololo hoonanea no keia wahi. (Keliwaiwaiole 1885:4)

These are the famed things that I was shown by a native of these lands. There are two *lehua* trees that move from right to left on the *pāhoehoe* above these waterfalls. Their names are the *lehua* of Pane and the *lehua* of Ehu, and they are adornments to the child ('Akaka) found here. There is a large boulder found more upland named Kaloa, who is the father, and there is a round pool there too, whose name is Kulanikapele and who is the mother, and there is a 'ōhi'a tree growing along the cliff's northern face named Ohiaokalani, which is the grandfather, and there is a *heiau* there that was used by chiefs of the past. On the western bluff of the cliff is a protuberance that juts out named Laeolono, which is the grandmother of that child. Lastly, there are smaller falls to the southern side whose names are Ukuula, Hualei, and Ahaa, who were female retainers of this child. There are numerous time-passing stories of this place.

When it was time for lunch, Keliwaiwaiole and his entourage picnicked at 'Akaka. They laid out their spread of food, which consisted of things like *hō'io*, 'ōpae, 'o'opu, and *poi*, and decorated their eating area with ferns, 'ie'ie, ginger, and *maile* that they gathered in the forest. Because of their visit, Kawaiwaiole was moved to recall lines from a prayer lovingly composed in honor of 'Akaka:

*A ka luna nae wau i Akaka
Luhe ana ka lehua noho i ka wai
Nawai e ole ka mahui koni
I ka nani o na lehua Apane
Pane mai ko leo me ka nanahe
Loku e ka halia i ka puuwai.*

I am indeed at 'Akaka
The lehua droop into the waters
Who would deny themselves the pleasure of
The beauty of the lehua of Pane
Your voice responds with sweetness
Drenched by memories of the heart
(Keliwaiwaiole 1885:4)

The accounts written by Poli and Keliwaiwaiole are two of many accounts published by Hawaiians who made their way to the famed waters of Akaka. Their writings evidence a history of travel and sightseeing throughout Hilo Palikū.

Pau Kuhihewa Iā Hilo Palikū-Completely Mistakened by Hilo Palikū

One of the sayings for the Hilo Palikū region of Hilo is “pau kuhihewa iā Hilo Palikū,” which translates to “Hilo Palikū is completely mistaken.” In historical sources, authors used this saying as an expression of disdain for someone who lies or does keep promises. In August of 1900, an author under the penname “Hawaii Oiaio” published an article that explains the origins and usage of “pau kuhihewa iā Hilo Palikū. In his article titled “Pau Ole Kuhihewa la Hilo Palikū,” Hawaii Oiaio addresses it to members of the Aloha ‘Āina political party, including Joseph Nawahū, William White, John Richardson, Thomas Clark, Reverend John Kalana Hihio, J. Nazareka, David Kalauokalani, James Kaulia, Robert Wilcox, and William Auld, which he chastises for their pro-Kingdom politics. Although the excerpt that is included below focuses on the story of the Hilo Palikū saying, the overall message of the article encourages readers to pursue leadership positions within the newly formed government of the Territory of Hawai‘i:

O ka huaolelo a hopunaolelo mahuna ae e kau ae la, “Pau kuhihewa ia Hilo Paliku,” he huaolelo kaulana loa keia mai ka wa kahiko loa mai o ko kakou aina, mawaena o na ho loh [sic] elua, e lilo i mau halekipa, a i mau aikane “Punakeonaona, ina no Maui, Oahu, Kauai ke kanaka i hoaikane me ko Hilo, a ina paha ma Maui kahi i launa ai, alaila, ua mopopo [sic] no i ke kanaka o Hilo ka makemake o ka hoaloha o Maui he waa alaila, pane aku la ke kanaka o Hilo, he wahi waa no ko ‘u makemake no ia, e lawe koke mai hoi ha oe, ae, ua pono.

Oi kali aku ke kanaka o Maui a, a hala ae ana he anahulu, a hala aku ana ua anahulu, pau ka palena o ka pono, o kau nae kai puhi aku la ia iala, a hoka iho la ke kanaka o Maui. Pane iho la ke kanaka o Maui, he lohe akahi no a ike maka, nolaila, ua ailolo na kanaka o Maui, Oahu, Molokai, Lanai, Kuai i ko Hilo Poe i ka hoopunipuni, pili nae keia i ka poe kalaiwaa.

The saying and sentence located above, “Hilo Palikū is mistakened completely,” it is a legendary saying from the ancient times of our land, that arouse between two friends, who became best friends, and later became companions. “Punakeonaona, indeed if the person from Maui, Oahu, and Kauai befriended Hilo’s [person], and if on Maui is where they enjoy each others company, and then, the person in Hilo would know that their Maui friend is in need of a canoe, and then, the Hilo people responds, I definitely have a canoe that was painted black, I will leave and then return, and then, the person from Maui responded, that is what I desire, please bring it quickly, indeed, it is needed.

Whilst the person from Maui waited, a month passed, and another month passed, he reached his limit and became furious and disappointed. The person from Maui told the person from Hilo, I heard you but I have yet to see it with my own eye, therefore, the people of Maui, Oahu, and Lanai were scorned. Hilo’s people, in particular the canoe carvers, trade in lies. (Oiaio 1900:6)

Although the saying is one that does not see people from Hilo Palikū as favorable or honest, it is one that speaks of the region’s long history of interisland exchange and communication.

Historical Accounts of Hilo Palikū

Some of the earliest written descriptions of the South Hilo district come from the accounts of the first Protestant Missionaries to visit the island. Early Historic visitors to the region noted the beauty, fertility, and ruggedness of this part of the island. In 1823, the Reverend William Ellis one of the first Christian missionaries to arrive in Hawai‘i passed along the South Hilo coast during his tour of Hawai‘i Island. Having been warned against walking due to the ruggedness of the terrain, he sailed from Hilo to Laupāhoehoe in a canoe. Ellis (2004:344) described the South Hilo coastline as follows:

The country, by which we sailed, was fertile, beautiful, and apparently populous. The numerous plantations on the eminences and sides of the deep ravines or valleys, by which it was intersected, by streams meandering through them into the sea, presented altogether a most agreeable prospect.

After departing Hilo Bay, Ellis and his party did not land again until Laupāhoehoe, where he and his traveling companions continued on foot, passing along the coastal cliffs of the Hilo and Hāmākua districts. It was on this leg of his journey that Ellis described the cultivated *kula* lands of the region that extended between the various valleys and gulches:

The houses stood mostly singly, and were scattered over the face of the country. A rich field of potatoes or taro, five or six acres in extent, or large plantations of sugar-cane and bananas, occasionally bordered our path. But though the soil was excellent, it was only partially cultivated. (Ellis 1963:249-250)

Overland travel across the central and northern Hilo District remained difficult throughout the first part of the nineteenth century due to its rugged coastline and many deep gulches. Transportation difficulties may have even temporarily delayed large-scale commercial exploitation of the *kula* lands in the vicinity of the study area (Desilets et al. 2004). Initial commercial exploitation of these lands was limited to small scale agriculture in areas with coastal access for shipping and receiving goods. The Reverend Titus Coan (1882:31-32), who settled at the Hilo Mission Station in 1835, wrote that:

For many years after our arrival there were no roads, no bridges, and no horses in Hilo, and all my tours were made on foot... The path was a simple trail, winding in a serpentine line, going down and up precipices, some of which could only be descended by grasping the shrubs and grasses, and with no little weariness and difficulty and some danger.

By the mid-1800s, the first roads had been established along the coast of South Hilo, perhaps following the route of the older path described by Coan (PHRI 1991). These first roads, designed for travel on horses and in carts, were likely developed by landholders, primarily sugar growers, looking to connect their plantation lands. Chester S. Lyman, traveling from Kawaihae to Hilo with the Reverend Titus Coan on June 19th, 1846, stayed in the vicinity of one of the early sugar plantations located to the south of the study area. In his journal, he described travel along a cart road and discussed the holdings of Mr. Castle, the progenitor of the first sugar plantation in the area. Lyman (1925:81) writes:

After resting we started on at 4 1/2 & soon arrived at Mr Castle's, 3/4 of a mile beyond. When half way there we fell in with two carts each drawn by 4 yokes of oxen, one set of them just broken in; the two teams were connected by a long rope & went on by *fits & starts*, now stopping & now going on the run. The carts were large & heavy with thick solid wheels made of planks pinned together. They were well filled with a crowd of noisy girls & boys & by invitation of the Driver, an American, I took a ride in one of these Hawaiian Coaches as far as Mr Castle's house, glad thus to relieve a little my feet which were becoming sore from walking in water and climbing precipices.

Stopped a few minutes at Mr [Castle]'s; were entertained with a refreshing bowl of milk, & then going on a mile & a half or 2 miles put up for the night at a native house, nearby. The place is called *Puumoi*. Mr. Castle is an American, has been in the country many yrs, has an extensive plantation & a native wife & family. Near his house we passed large fields of sugar cane on his lands, but cultivated by Chinamen who have pretty much monopolized the sugar business in this region. Mr [Castle] has also considerable herds of cattle.

A historical reference to a renowned person who lived in Mālamalamaiki can be found in the 44th installment of *Reminiscences of Honolulu Thirty-five Years*, a serial account that was published by Henry L. Sheldon between 1881 to 1883 in the English-language newspaper *Saturday Press*. Published on December 9, 1882, Sheldon notes the death of Dr. John Pelham on March 16th 1857, an Englishman who served as a medical adviser to the *ali'i* Kālaimoku, Kuakini, and Ka'ahumanu. Following this note about Pelham's demise, Sheldon reminisces about a visit with Pelham years prior:

[Pelham] had resided in the Islands since the year 1826, and was the medical adviser of the high chiefs Kālaimoku, Kuakini and Kaahumanu. He was well educated and well read in his profession, but quite eccentric in his manner. Some six years previous to his death he was living at a place called **Malamalamaiki**, about fifteen miles north of Hilo, where I had occasion to call upon him while on a tour around the Island of Hawaii. Arriving at his very neat and comfortably arranged and furnished thatched cottage about 8 o'clock in the evening, in the midst of one of those soaking rains for which Hilo was then proverbial (The climate is said to have changed since). I received from the Doctor a bluff but hearty welcome, and the intimation that supper would be ready as soon as I had exchanged my drenched garments for dry ones. I was desperately hungry after my long ride from the bay, and visions of roast pig and taro, or mullet baked in ti-leaves, flitted through my mind. At length I was ceremoniously ushered into the dining-room, and, with the remark from my host that I must excuse him for that he had already supped, was hospitably urged to "eat hearty"--of a *raw squid* and poi! That was the entire bill of fare. I was, however, equal to the occasion, and managed to bolt--it was impossible to thoroughly masticate--enough of octopus and paste to stay my stomach. I had been previously informed of Pelham's eccentricities, and noted the twinkle of his eye while I wrestled

with "the supper." At the conclusion of the necessarily brief repast the Doctor invited me to join him in "a glass of something hot." Directly a native woman brought in a japanned tray, on which were two steaming tumblers crowned with closed lemon. After such a barbarous supper this seemed the opposite extreme of civilized luxury. I sipped contentedly at the soothing mixture; but was only restrained from remarking upon its peculiar aroma by my regard for the proprieties. The evening was spent in pleasant converse, in the course of which the Doctor related many interesting recollections of the native chiefs with whom he had been familiar, especially of Governor Adams, as Kuakini was called. I was comfortably lodged (even luxuriously, for those days), and in the morning sat down to a nice breakfast of pork chops, *lawalu'd* fish, baked potatoes, biscuit and coffee. Noticing the satisfaction with which I regarded the board, my host dryly remarked that he had been pleased to see that I knew how to "rough it" in Hawaii, by the way in which I had attacked raw squid the previous evening, whereupon I was emboldened to inquire as to the particular brand of spirits that had entered into the composition of the hot punch with which I had washed the supper down. For reply he produced from the cupboard two small empty bottles, marked in plain letters, "Lavender Water," with the simple remark, "There."

Lest my readers should suppose that our punch on the occasion mentioned was made of the article generally known as lavender water, I will here explain: Previous to the ratification of the treaty with France in 1858 the duty on imported spirits in this kingdom was \$5 per gallon. One of the results of the high duty was the importation of large quantities of alcohol, disguised under the names of cologne, lavender, bitters, etc., which paid a duty of only 5 per cent, *ad valorem*, and which was freely sold all over the islands and used as a beverage instead of the high-priced brandy. Brandied peaches, cherries and other fruits came under the same category, and were at one time largely imported and consumed here. (Sheldon 1882:1)

In 1872, Isabella Bird traveled by horseback along the Hāmākua Coast from Onomea to Waipi'o Valley and described the general terrain and the difficult passage through the various gulches she crossed. Although Honouliuli is not specifically mentioned in her account, she would have inevitably passed through the Honouliuli area on her journey towards Waipi'o. Of the region she writes:

All the gulches for the first twenty-four miles contain water. The great Hakalau gulch we crossed early yesterday, has a river with a smooth bed as wide as the Thames at Eton. Some have only quiet streams, which pass gently through ferny grottoes. Others have fierce strong torrents dashing between abrupt walls of rock, among immense boulders into deep abysses, and cast themselves over precipice into the ocean. Probably, many of these are the courses of fire torrents, whose jagged masses of a-a have since been worn smooth, and channeled into holes by the action of water. A few are crossed on narrow bridges, but the majority are forded, if that quiet conventional term can be applied to the violent floundering by which the horses bring one through. (Bird 1974:88).

The *Māhele* 'Āina of 1848

By the mid-19th-century, the Hawaiian Kingdom was an established center of commerce and trade in the Pacific, recognized internationally by the United States and other nations in the Pacific and Europe (Sai 2011). As Hawaiian political elite sought ways to modernize the burgeoning Kingdom, and as more Westerners settled in the Hawaiian Islands, major socioeconomic and political changes took place, including the formal adoption of a Hawaiian constitution by 1840, the change in governance from an absolute monarchy to a constitutional monarchy, and the shift towards a Euro-American model of private land ownership. This change in land governance was partially informed by ex-missionaries and Euro-American businessmen in the islands who were generally hesitant to enter business deals on leasehold lands that could be revoked from them at any time. *Mōʻī* (Ruler) Kamehameha III, through intense deliberations with his high-ranking chiefs and political advisors, separated and defined the ownership of all lands in the Kingdom (King n.d.). They decided that three classes of people each had one-third vested rights to the lands of Hawai'i: the *Mōʻī*, the *aliʻi* and *konohiki*, and the native tenants (*hoaʻāina*). In 1846, King Kamehameha III formed the Board of Commissioners to Quiet Land Titles (more commonly known as the Land Commission) to adopt guiding principles and procedures for dividing the lands, grant land titles, and act as a court of record to investigate and ultimately award or reject all claims brought before them (Bailey in Commissioner of Public Lands 1929). All land claims, whether by chiefs for an entire *ahupuaʻa* or *ʻili kūpono* (nearly independent *ʻili* land division within an *ahupuaʻa*, that paid tribute to the ruling chief and not to the chief of the *ahupuaʻa*), or by *hoaʻāina* for their house lots and gardens, had to be filed with the Land Commission within two years of the effective date of the Act (February 14,

1846) to be considered. This deadline was extended several times for chiefs and *konohiki*, but not for native tenants (Soehren 2005).

The King and some 245 chiefs spent nearly two years trying unsuccessfully to divide all the lands of Hawai'i amongst themselves before the whole matter was referred to the Privy Council on December 18, 1847 (King n.d.; Kuykendall 1938). Once Kauikeaouli and his chiefs accepted the principles of the Privy Council, the *Māhele* 'Āina (Land Division) was completed in just forty days (on March 7, 1848). The names of all of the *ahupua'a* and *'ili kūpono* of the Hawaiian Islands, as well as the names of the chiefs who claimed them, were recorded in the *Buke Māhele* (*Māhele* Book) (Buke Māhele 1848; Soehren 2005). As this process unfolded, King Kauikeaouli, who received roughly one-third of the lands of Hawai'i, realized the importance of setting aside public lands that could be sold to raise money for the government and also purchased for fee simple title by his subjects. Accordingly, the day after the division when the name of the last chief was recorded in the *Buke Māhele*, the King commuted about two-thirds of the lands awarded to him to the government (King n.d.). Unlike Kauikeaouli, the chiefs and *konohiki* were required to present their claims to the Land Commission to receive their Land Commission Awards (LCAw.). The chiefs who participated in the *Māhele* were also required to provide to the government commutations of a portion of their lands in order to receive a Royal Patent giving them title to their remaining lands. The lands surrendered to the government by the King and chiefs became known as "Government Land." The lands personally retained by the King became known as "Crown Land." Lastly, the lands received by the chiefs became known as "Konohiki Land" (Chinen 1958:vii; 1961:13). To expedite the work of the Land Commission, all lands awarded during the *Māhele* were identified by name only, with the understanding that the ancient boundaries would prevail until the lands could be formally surveyed.

Disposition of Mālamalamaiki

On February 3, 1848, the *ali'i* Kekuapanio (also spelled Kuapanio) laid claim to three lands, one of which included Mālamalamaiki Ahupua'a. This *ahupua'a* was subsequently awarded to him as 'āpana (parcel) 2 of LCAw. 130. Prior testimony was given on October 27, 1848, by John Young, one of Kamehameha I's foreign military advisors, specified that before the *Māhele* 'Āina, Mālamalamaiki was held by John Young, but at the request Poki (Boki, Governor of O'ahu), Mālamalamaiki was returned to King Kauikeaouli. At the time of the *Māhele*, King Kauikeaouli gave Mālamalamaiki to Kekuapanio, who was considered a *hulimanu*, a class of young nobles who were favorites of the chief. According to records obtained at the Edward Olson Trust Archives, after Kekuapanio died, the land was retained by his heir, Huakini of Honolulu, O'ahu. Historical records indicate that Huakini was a defendant in a lawsuit against James W. Marsh, Marshall of the Hawaiian Islands, who through a court ruling levied Huakini's personal and real property, including Mālamalamaiki, and sold it at a public auction to Charles C. Harris for the sum of \$226 on May 6, 1859 (Edward Olson Trust Archives HSC2-24; HSC2-35).

Kuleana Awards

As the King and his *ali'i* and *konohiki* made claims to large tracts of land via the *Māhele*, questions arose regarding the protection of rights for the native tenants. To resolve this matter, on August 6, 1850, the *Kuleana* Act (also known as the Enabling Act) was passed, clarifying the process by which native tenants could claim fee simple title to any portion of lands that they physically occupied, actively cultivated, or had improved (Garavoy 2005). The *Kuleana* Act also clarified access to *kuleana* parcels, which were typically landlocked, and addressed gathering rights within an *ahupua'a*. Lands awarded through the *Kuleana* Act were and still are, referred to as *kuleana* awards or *kuleana* lands. The Land Commission oversaw the program and administered the *kuleana* as Land Commission Awards (LCAws.) (Chinen 1958). Native tenants wishing to make a claim to their lands were required to register in writing those lands with the Land Commission, who assigned a number to each claim, and that number (the Native Register) was used to track the claimant through the entire land claims process. The native tenants registering their *kuleana* were then required to have at least two individuals (typically neighbors) provide testimony to confirm their claim to the land. Those testimonies given in Hawaiian became known as the Native Testimony, and those given in English became known as Foreign Testimony. Upon provision of the required information, the Land Commission rendered a decision, and if successful, the tenant was issued the LCAw. Finally, to relinquish any government interest in the property, the holder of a LCAw. obtained a Royal Patent Grant from the Minister of the Interior upon payment of the commutation fee. With respect to the study area, it appears that no *kuleana* claims were made for lands in Mālamalamaiki.

Government Land Grants

In conjunction with the *Māhele*, the King also authorized the issuance of Royal Patent Grants to applicants for tracts of land, larger than those generally available through the Land Commission. The process for applications was clarified by the "Enabling Act," which was ratified on August 6, 1850. The Act resolved that portions of the Government Lands established during the *Māhele* of 1848 should be set aside and sold as grants ranging in size from one to fifty acres at a cost of fifty cents per acre. The stated goal of this program was to enable native tenants, many of whom were not awarded *kuleana* parcels during the *Māhele*, to purchase lands of their own. Despite the stated goal of the land grant program, this provided the mechanism that allowed many foreigners to acquire large tracts of the Government Lands. Unlike in the *kuleana* claims, where claimants stated their use of the land, the grant records are silent regarding the grantees' intended use. The Royal Patent deeds and survey notes do contain some limited information about geographical features, vegetation, and survey markers, but they generally do not say anything about improvements to the land or land use.

South of the project area in Mālamalamaiki 1st, a single grant parcel (Royal Patent No. 1358) was purchased in 1854 by William Farwell for \$51.50. While the location of this 52.6-acre grant is shown in Hawai'i Registered Map No. 1092 by W. A. Wall (Figure 17). Farwell's grant boundaries appear to be incorrectly depicted as it is shown extending well into Mālamalamaiki 2. Another Hawai'i Registered Map No. 570 (Figure 18) dated 1879 does not show the location of Farwell's grant but it does show other grants in nearby Honomū as well as what appears to be built structures (depicted as square-like symbols) *mauka* the project area. The 1879 map (see Figure 18) also shows the route of the Government Road *mauka* of the project area. The surveyor notes for Farwell's grant (Figures 19 and 20) described *hala* trees along the coast, as well as natural features such as the cliff and ravines as well as a road.

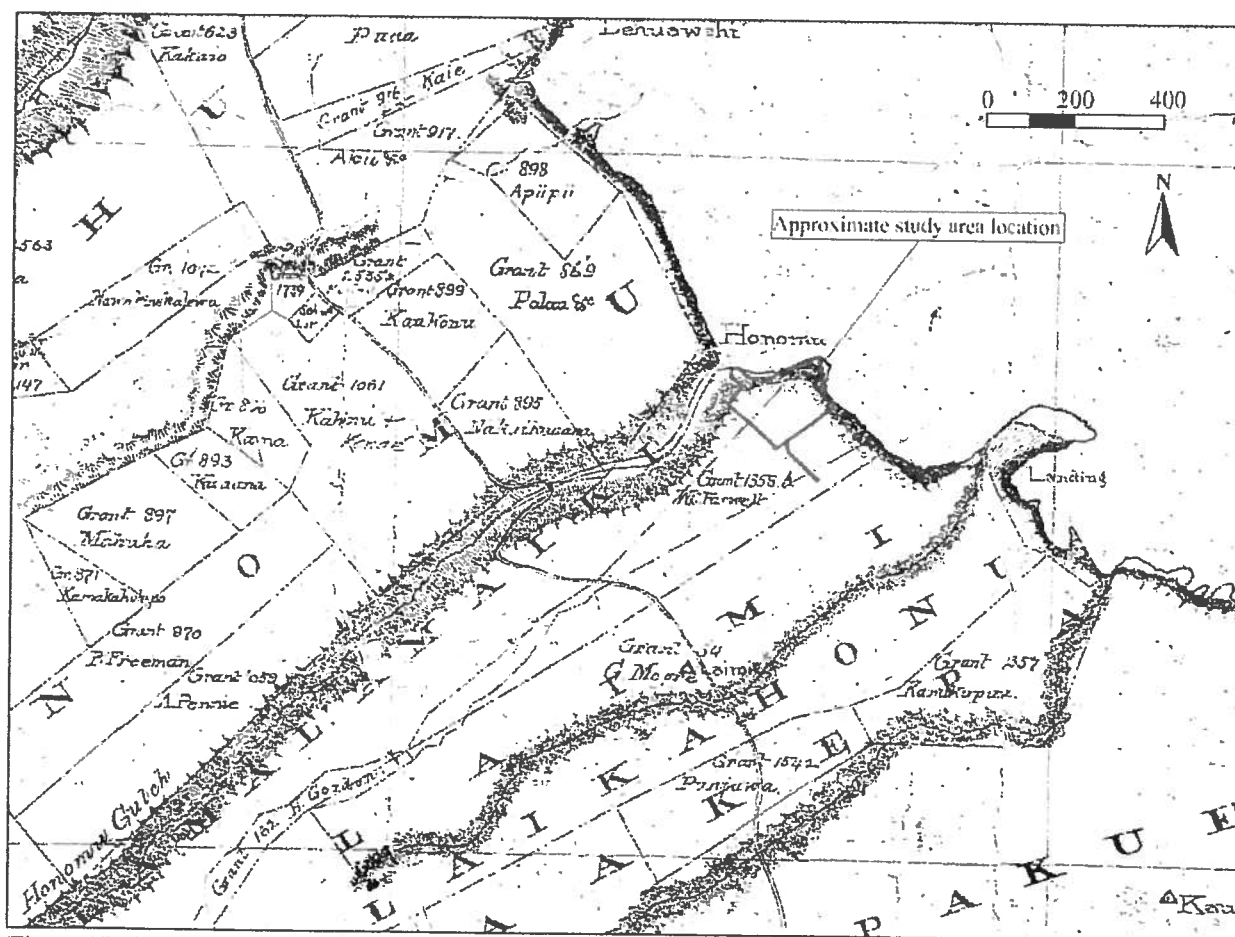


Figure 17. A portion of Hawai'i Registered Map No. 1092 by W.A. Wall showing Royal Patent Grant No. 1358 to W. Farwell and the approximate project area location.

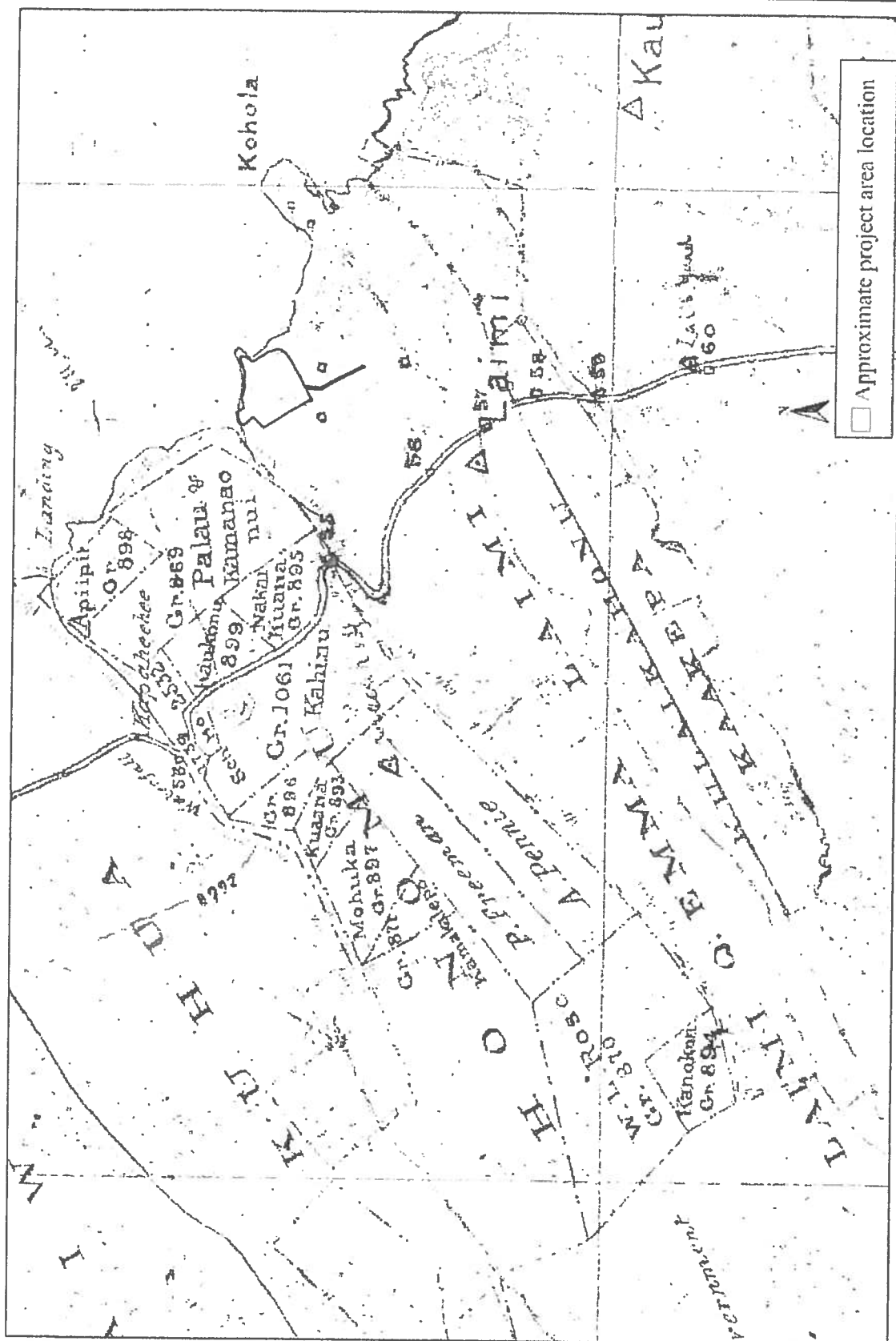


Figure 18. A portion of Hawai'i Registered Map No. 570 from 1879 by C. J. Lyons showing land grants in nearby Honomū as well as structures mauka of the project area.

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NO. 1358.

ROYAL PATENT.

KAMEHAMEHA III. By the grace of God, King of the Hawaiian Islands, by this His Royal Patent, makes known to all men, that he has for himself and his successors in office, this day granted and given, absolutely, in Fee Simple unto *William C. Farwell* his faithful and loyally disposed subject for the consideration of *fifty one dollar* paid into the Royal Exchequer, all that piece of Land situated at *Malamalamaiki* in the Island of *Hawaii*, and described as follows:

Commencing at a *laukaha* tree marked *B*, on the *little* side of a water run, being the boundary between this land and *Waima* the chains, from the pole above the sea, thence across this land along and above the *kali kakae*, at *52° N* 10 chains and 12 feet, to a *laukaha* post in the bottom of a small ravine 23 feet from the edge of the pole, being the boundary line between this land and *Malamalamaiki* 2, and forming the extreme *N* angle of this survey, thence up the line of boundary *S 45° N* 15 chains 30 feet, thence *S 34½° N* 8 chains, thence *S 32° N* 5 chains, thence *S 33° N* 7 chains 13 feet, thence *S 49½° N* 7 chains 3 feet, thence *S 39° N* 2 chains, thence *S 40° N* 6 chains 40 feet, thence *S 42° N* 11 chains 60 feet, thence *S 1° N* 48 feet, thence *S 35° N* 5 chains 30 feet to extreme *S* angle of *Waima* Patent, thence re-commencing at the extreme *E* *N* angle of *Waima* Patent, and following up the same boundary line *S 49° N* 10 chains, thence *S 35° N* 6 chains 20 feet, thence *S 49° N* 10 chains, thence West *N* 7 chains 40 feet, thence *S 31° N* 10 chains 40 feet to the woods, being the extreme *E* *N* angle of this survey, thence along the edge of the woods *S 6° E* 5 chains 20 feet to extreme *S* *N* angle of this survey, thence down the boundary line of this land and *Waima* *N 41° E* 16 chains 40 feet, thence *N 62° E* 5 chains 40 feet, thence at *55° E* 5 chains 60 feet, thence at *31° E* 5 chains 20 feet, thence at *33½° E* 5 chains 30 feet, thence at *36° E* 5 chains 60 feet to the extreme *S* *N* angle of *Waima* Patent, thence re-commencing at the extreme *S* *E* angle of *Waima* Patent, and following down the same boundary line of the northern side of the road leading towards the woods.

Figure 19. Scanned copy of Royal Patent Grant No. 1358 to Farwell, page 1 of 2 (OHA 2018).

300
 & the boundary line) N 35° E 2 chains 6 feet thence N 67° W 2
 chains 60 feet thence N 1° E 1 chain 26 feet thence N 53½° E 2 chains
 30 feet thence N 24° E 4 chains 12 feet thence N 53½° E 2 chains 12 feet
 thence N 37° E 6 chains 60 feet thence N 47° E 4 chains 56 feet thence
 N 17° E 1 chain 30 feet thence N 31° E 2 chains 26 feet thence N 22° E
 2 chains 12 feet thence N 57° E 4 chains thence N 42° E 2 chains thence
 N 54° E 2 chains 12 feet to a stake on the Northern side of the Road,
 being the extreme S.W. angle of the Metcalfs survey of Mr. Metcalf's
 Patent on Saini, thence by his line of survey N 32° E 42 chains
 to the place of beginning

Containing 52.67 ac.
 excepting and reserving to the Hawaiian Government, all mineral or metallic Mines of every description.
 To have and to hold the above granted Land in Fee Simple, unto the said William
 B. Farwell, his Heirs and Assigns forever, subject to the tax to be from time
 to time imposed by the Legislative Council equally, upon all landed Property held in Fee Simple.

In Witness Whereof, I have hereunto set my Hand, and caused the Great Seal of the
 Hawaiian Islands to be affixed, at Honolulu, this 10th day of
 March 1854.

Signature: Kamehameha
 Signature: Kamehameha
 Signature: Kamehameha

Figure 20. Scanned copy of Royal Patent Grant No. 1358 to Farwell, page 2 of 2 (OHA 2018).

Commercial Sugar, Boundary Commission Testimony, and Railroad (ca. 1880-1994)

Following the *Māhele* and the signing of the 1875 Treaty of Reciprocity, a free-trade agreement between the United States and the Kingdom of Hawai'i which guaranteed a duty-free market for Hawaiian sugar in exchange for special economic privileges for the United States, commercial sugarcane cultivation and sugar production became the central economic focus for the Hilo area. By 1874, Hilo already ranked as the second-largest population center in the islands and within a few years the fertile uplands, plentiful water supply, and port combined to make Hilo a major center for sugarcane production and export. The plantation lands commonly extended some two to three miles inland from the coast (Best 1978). Elevations typically ranged from 250 feet above sea level along the shoreline bluffs to 2,000 feet above sea level at their western (*mauka*) limits. Ocean frontage could range from two to six miles. Railroads operating on steam and animal power were built on some plantations by 1887, however, some plantations utilized flumes or cable railways to transport cane from the fields to the coastal mills.

With the purported annexation of Hawai'i to the United States in 1898 and subsequent granting of Territory status in 1900, Hilo was designated the center of county government in 1905 and remained the second most populated city in Hawai'i (Dorrance and Morgan 2000; Sai 2011). Sugar cultivation continued to be the island's most lucrative industry until the ca. the 1970s (Dorrance and Morgan 2000). The sugar industry brought widespread changes to the Hilo area and drastically altered the traditional natural and cultural landscape of the district. As part of the late 19th-century development of the sugar plantations and related infrastructure, some of Hilo's largest fishponds (Hanalei, Kalepolepo, Mohouli, Waiāhole, and Hō'akimau) were filled in, and many old residences, burial sites, trails, *heiau*, formerly located in the cane fields were destroyed as a result.

In prospecting Hilo for land suitable for development, a report was made by the Royal Commissioners on Development of Resources. Formed by King David Kalākaua in 1877, commissioners conducted examinations of lands along the Hāmākua/Hilo coastline and consulted with residents in an effort to learn about needs and natural resources. In 1877, Honomū was investigated for its potential as a landing and sugar mill location:

At Honomu, in ordinary weather, a good landing can be made in a surf boat, and would only need a buoy; parties are projecting a small plantation on this land with a mill in the gulch. There are some 1500 acres of Government land in the vicinity, and 1250 sold to private parties, some of which is cane land. The establishment of a good mill at Honomu would greatly add to the value of these lands. (Maly and Maly 2006:48)

Three years later in 1880, M. Kirchoff & Company, along with C. Brewer & Company, Ltd. as agent, established Honomū Sugar Company on 2,400 acres of land within the South Hilo District (Dorrance and Morgan 2000). The Honomū Sugar Company mill was located on the coast, north of the project area, and the upper region of Honomū was interspersed with small-farm homesteaders (Figure 21). The expansion of the Honomū Sugar Company into Mālamalamaiki began in May of 1886 when Edward Witschy lease four acres of land to the Honomū Sugar Company (Edward Olson Trust Archives HSC2-18-19). Witschy had purchased Mālamalamaiki 2 from Charles C. Harris in May of 1875 after Harris had purchased the *ahupua'a* in an 1859 public auction (Edward Olson Trust Archives HSC2-37, 35). In 1877, Witschy sold Mālamalamaiki to William and Caroline Kinney but in 1886, Witschy along with his attorney, D. H. Hitchcock appeared before the Commissioners of Boundaries to settle the boundaries of Mālamalamaiki 2 (Edward Olson Trust Archives HSC2-46).

Boundary Commission Testimony (1886 and 1874)

As the Honomū Sugar Company continues to expand its operations, they began the process of acquiring adjacent tracts of land which eventually included the current project area. In 1862, the Commission of Boundaries (Boundary Commission) was established in the Kingdom of Hawai'i to legally set the boundaries of all the *ahupua'a* that had been awarded solely by name as a part of the *Māhele 'Āina*. Subsequently, in 1874, the Boundary Commission was authorized to certify the boundaries for lands brought before them. The primary informants for the boundary descriptions were old native residents who typically learned of the boundaries from an elder relative or neighbor. The boundary information was usually given in Hawaiian and simultaneously transcribed by the courts into English. The information described by the informants tell of natural and built features as well as traditional place names and its uses specific to Mālamalamaiki.



Figure 21. A 1929 aerial photograph of the Honomū Sugar Mill; project area now shown.

Testimony concerning the boundaries of Mālamalamaiki was collected on two separate occasions. The first hearing for the boundaries of Mālamalamaiki 1st occurred in June of 1874 and the second for Mālamalamaiki 2 was in August 1886. On June 30th, 1874 the Commissioners met at the Hilo Court House on the application of L. McCully, the attorney for Noa Kaikinui, to settle the boundaries of Mālamalamaiki 1st. Prior to the hearing of testimony, P. Ama, a land surveyor provided the following statement concerning his survey of Mālamalamaiki 1st:

Notes of survey filed by P. Ama; on May 1st 1874 presented by applicant. Ama took oath May 1st as to said Notes of survey. He said, I am a land surveyor and surveyed this land as Kauena pointed out boundaries to me, and copied Notes of survey from Patents of adjoining lands from the Kaupakuea hawaii [sic] I surveyed up the road to Ohiakiikii and not on the boundary, but surveyed across to boundary at flume

The first native primary informant was Kauena who was a multi-generational resident of Mālamalamaiki. According to notes from the testimony, Kauena was about 70 years old at the time of the hearing, thus placing his date of birth sometime around 1804. Kauena's testimony as well as those provided by two other native informants, Kaiakoili and Nawai are provided below:

Kaunena k. Sworn

I was born at Malamalamaiki during the reign of Kamehameha I and have always lived there, and my forefathers before me. I was large enough to go about at the time of the battle of Kuamoo. Know the boundary of the land as it is a small one, and a trail is the boundary between the two Malamalamaiki. Know Ama and pointed out the boundaries between the two lands to him. He surveyed the one adjoining Honomu gulch, and he surveyed it as I pointed it out. He commenced at the mauka corner at Ohiakiikii a resting place on the road in the woods he then surveyed down the road to hawaii of Kaupakuea, not on the boundary. Thence towards Hamakua to where I pointed out the boundary between the two lands. Thence to Naomi's land on Malamalamaiki 1. (He surveyed as I told him without disputing the boundaries) From the mauka corner of Naomi's land to the shore the adjoining land has been sold. We went to shore and surveyed across from corner of land sold to Honomu gulch.

The Honomu gulch is on the Hamakua side of this land and is the boundary from shore to opposite Ohiakiikii where Malamalamaiki is cut off by Honomu. Bounded makai by the sea.

Kaiakoili k. Sown

I went and carried the chain with Nawai when Ama surveyed the land Kauena was the kamaaina. Commenced at Ohiakiikii and surveyed across the land to Honomu gulch. Marked a tree at Ohiakiikii, and from thence surveyed down the road to flume. We then went down to where we came to the gulch and surveyed from there across to Honomu gulch. Then we to Palau's houses and surveyed to shore, and then across to the Honomu gulch. We went where Kauena pointed out.

Nawai k. Sworn

I went with Kauena and Kaiakoili when Ama surveyed the land. My knowledge is the same as the last witness has testified to. (Boundary Commission 1874a:283-284)

Following the testimony, the Commission heard the following statement from McCully, "...stated he finds that this land was sold to His Ex. C.C. Harris, paid cost, and declined to go any further in matter" (Boundary Commission 1874a:284)

On August 6th, 1886, the Commissioners of Boundaries convened again at the courthouse in Hilo on the application of D. H. Hitchcock, the attorney for Edward Witschy, to settle the boundaries of Mālamalamaiki 2. Sworn testimony for Mālamalamaiki 2 was provided by Kauhane, Bila Kamakana, and D. H. Hitchcock. Although no information concerning land use is noted in the testimony, information about traditional place names are mentioned. Their testimony is transcribed in its entirety below:

Kauhane sworn

Malamalamaiki first adjoins the land from the sea to "Kaloaawapuhi"; then Laimi joins, a road being the boundary; to "Kapoalua", where Honomu and Laimi meet, and Malamalamaiki 2nd ends. From Kapoalua down, the boundary of Malamalamiki 2nd and Honomu is an awawa [gulch] to the big gulch, which branches, the south branch being the boundary down to the sea; between Honomu and Malamalamaiki 2nd the north branch is large where it enters the woods, but it soon ends. "Kaili" is really the principal branch of the Honomu gulch, which runs a long way up into the woods—the stream of water in the gulch is the boundary between Honomu and Malamalamaiki 2nd to the sea; bounded makai by the sea.

Bila Kamakana sworn

Kauhane has told the boundaries correctly.

D. H. Hitchcock sworn

I surveyed the land of Malamalamaiki 2nd along the adjoining Royal Patents, as far as they go, and on along the boundaries as they were pointed out by Bila Kamakana; the land is very narrow above to the place called "Poalua." The survey of Malamalamaiki 2nd runs along the main branch of the Honomu gulch, which branches in the woods. (Boundary Commission 1874b:41-42)

After Mālamalamaiki was deeded to Kinney, the acting manager for the Honomū Sugar Company (Lane 1890), he sold a portion of the *ahupua'a* in 1886 to the Honomū Sugar Company and retained a portion for his heirs (Edward Olson Trust Archives HSC2-83).

Development of Railroad Infrastructure (ca. 1901-1946)

In 1890 the plantation was producing 2,000 tons of sugar yearly. Initially, no Hilo coast plantation had a railroad, so fluming was extensively utilized by the Honomū Sugar Company who shipped its product from Honomū Landing to Honolulu via inter-island vessels that anchored offshore. By the turn of the century, plans to install a railroad between Hilo and Honoka'a were being actualized. Railroad construction was one of the most important elements of governmental and private sector planning following the Treaty of Reciprocity, as crops and product were still being transported by beast and cart (Dorrance and Morgan 2000). On the Island of Hawai'i, the first major line to be constructed was in North Kohala District, which operated as the Hawaiian Railroad Company. The North Kohala line, however, was envisioned as only the first step toward a much larger system connecting the cane fields of Kohala, Hāmākua, and Hilo with Hilo Harbor, the only protected deep-water port on the island. Beginning in 1899, railroad lines began transporting sugar to the harbor for marine transport, thus Hilo became an important shipping and railroad hub.

Lorrin A. Thurston, who according to Thrum had "been connected with the enterprise from its initiation" (Thurston 1913:142), wrote an article upon the completion of the railroad from Hilo to Pa'auilo, Hāmākua in May of 1913 entitled "Railroading in Hilo" which was published in *Thrum's Hawaiian Annual and Almanac for 1914*. Thurston reported that the Hilo Railroad Company (HRC) initiated the railroad endeavor in 1899 from Waiākea south



Figure 23. A portion of the 1902 "Map of the Lands of the Honomu Sug. Co., (Edmund Olson Trust Archives).

The extension to Honoka'a would finally connect the sugar mills of South Hilo, North Hilo, and Hāmākua with Hilo's protected harbor. Between June 1909 and December 24, 1911, HRC built 12.7 miles of rail extending from Hilo to Hakalau Mill, crossing many deep gulches and valleys, including the current study area, along its route. This was followed by the construction of an additional 21 miles of rail that connected Hakalau with Pa'auilo to the north, which covered a total distance from Hilo of roughly 34 miles and was known as the "Hāmākua Division" (Thurston 1913:146). Thurston defined the objective of the Hāmākua Division thusly:

The principal object of the extension is to give adequate transportation facilities between Hilo and the fertile and well-settled territory extending for 50 miles north of the town of Hilo, and averaging three to four miles in width. This district produces nearly one-fourth of the entire output of sugar of the Territory and is, including the town, the home of over 30,000 people. The only means of access to this section has heretofore been by wagon road, almost impassable in rainy weather, and by derrick and cable landings over bluffs rising from 50 to 300 feet sheer from blue ocean. There are no harbors. (Thurston 1913:147)

Thurston described the scenery afforded to passengers who traveled on the Hāmākua Division as follows:

Incidentally, the road has opened up one of the most remarkable, unique and spectacular scenic routes to be found in any part of the world. It may appear impossible for a railroad to run through a thickly-settled, highly-cultivated country and yet be noted for spectacular scenery. The paradox is explained by the fact that the district lies along the base and on the steep slope of Mauna Kea, the highest mountain in the Pacific. . .

The combination of steep grade and heavy rainfall has resulted in excessive erosion, the mountain side being seamed at frequent intervals with deep gulches, in which the streams form innumerable cataracts and waterfalls. . .

Some conception of the rugged character of the country can be gained from the fact that in less than 34 miles, there are 211 water openings under the railroad track, ranging from a concrete culvert to steel bridges up to 1006 feet in length and 230 feet high. . . (Thurston 1913:147-149)

2. Background

The railroad can be seen crossing through the western portion of the subject parcel in a 1915 U.S.G.S. Honomū quadrangle (Figure 24). Also depicted in 1915 U.S.G.S. map is a flume traversing through the eastern portion of the subject parcel and descending into Mālamalamaiki Gulch before continuing north along the coastline. The environs of the study area were described by John W. Bains in an article entitled "Around About Hilo" that was published in a January 1913 edition of the *Mid-Pacific Magazine*:

Mile upon mile of sugarcane fields stretch away on both sides of the line, insistent evidence of the magnitude of Hawaii's most valued product. The quaint and unique method of conveying the cane from the uttermost borders of the fields to the very jaws of the mill rollers by the means of water flumes is to be seen at various points along the line. (Bains 1913:356–357)

Ultimately, the cost of the Hāmākua Division ruined HRC and the company was forced to sell and in 1916 they reorganize under the name Hawaii Consolidated Railway (HCR). By 1919, Honomū Sugar Company held roughly 2,300 acres of land; 1,271 of which were owned outright by the company, and 1,000 of which were leasehold. The company's cultivated sugarcane lands extended from 50 to 1,500 feet above sea level and were situated between the neighboring mills of Pepe'ekeo and Hakalau, including the majority of the current project area. A 1922 Hawai'i Registered Map No. 0799 (Figure 25) depicts the approximate extent of the Honomū sugar lands with respect to the neighboring plantations and shows the railroad track passing along the western boundary of the project area.

With the complete development of railroad infrastructure in the project area vicinity sugar production increased. A 1932 field map of the Honomū Sugar Company shows the current project area and the surrounding land to be within "Field 3", which included a land area of 44.80 acres, 37.45 acres of which were owned and operated by the plantation. Field 3 extended from the coast of both Mālamalamaiki 1st and 2nd to the Government Road (Figure 26). The 1932 field map shows the railroad extending along the *mauka* edge of the project area and a flume meandering along the sea cliffs in the *makai* portion of the project area. Additionally, the 1932 map (see Figure 26) shows the level tableland in the project area cultivated in cane whereas 1.25 acres of the cliff line (shaded orange) was cultivated in "Pali Planters cane." This included 0.7 acres of the parcel's rocky coastline (labeled "#84" in Figure 26) and 0.55 acres of the steep, Mālamalamaiki Gulch bank (labeled "#82" in Figure 26). The steep gulch banks and rocky coastal cliff edges in the South Hilo district made it difficult for the plantation companies' machinery to cultivate and harvest cane, therefore, independent contractors were hired to manually clear and cultivate cane in these marginal zones. The "Pali Planters" (cliff planters) were one such group contracted by the Honomū Sugar Company to clear and cultivate cane in these areas. By 1935, Pali Planters as well as other independent contracts became "adherent planters" to the sugar cane companies under the Agricultural Adjustment Act (Lands 1948).

While a similar scene is depicted in the 1932 Honomū Sugar Company title map (Figure 27), this map shows the extent of the Honomū Sugar Company infrastructure. Water was diverted from several perennial streams including Pāhe'ehe'e, Kolokole, and Honomū (which bounds the subject parcel to the north) through a 9-mile long network of flumes to the fields which grew several varieties of cane including "... Yellow Caledonia with a little Rose Bamboo and a small amount of different varieties sent from the Planters' Experiment Station" and crop yields were further supplemented by nearby homestead growers who dedicated approximately 400 additional acres of land to cane cultivation for the company (Evening Bulletin Industrial Edition 1909).

In 1920, HCR attempted to capture a larger piece of the growing tourist business with its adventurous scenic route tour dubbed the "Scenic Express." HCR had long offered service to Glenwood for tourists visiting Kīlauea, but motorbuses now dominated this route. The Hāmākua Coast, by contrast, was not easily accessible by automobile. HCR was therefore able to run passenger coaches profitably along the Hāmākua Division with stops at scenic points. Passenger business declined in the early decades of the twentieth century, and the rise of the automobile was a harbinger for the railroad. In 1920, 607,220 passengers were carried. In 1930, the number dropped to just 77,894 and continued as the years progressed, with passenger counts dropping as low as 16,681 in 1936 (Best 1978:145–146). As a result, the remaining passenger cars were converted for other uses, and the little passenger traffic which persisted was hauled on custom-built railbuses.

In the years following railway passenger-ship progressively dropped, but with the onset of World War II, usage spiked significantly due to war-time gas rationing and the dramatic influx of servicemen. By 1943 passenger totals had rebounded profoundly to 103,635 but inevitably, the popularity of automobiles began to take a toll on the railroad's industrial customers. As roadways were improved and gasoline prices dropped, simple economics favored trucking over trains. Ironically, just as rail transportation was in the throes of decline, HCR was by 1945 almost out of debt for the first time since its inception. The great *tsunami* of 1946, however, would soon seal its fate.

On April 1, 1946, a *tsunami* triggered by an earthquake in the Aleutian Islands slammed into the north-facing shores of Hawai'i Island, dealing a fatal blow to the already struggling HCR. Tracks around the waterfront were

entirely washed out and the Hilo Station was wrecked. An entire span of the Wailuku Bridge was torn out and washed out and “twelve miles north of Hilo, the railroad bridge at the mouth of the Kolekole Stream lost its center span” from a massive inundation of water that reached heights of 37 feet in Kolekole and neighboring Hakalau Gulch (Klein et al. 1985; MKE Associates LLC and Fung Associates, Inc. 2013:E8). The destruction from the *tsunami* was so severe that the HCR filed for abandonment soon thereafter, receiving permission to do so in December of 1946. Despite its destruction, the bridge-laden Hāmākua Division was later appropriated by the Territorial Government, who utilized the abandoned railroad alignment to construct the Hawai‘i Belt Road in the 1950s:

... the railroad asked shippers to determine whether they would use the line if it were rebuilt or were intending to ship their raw sugar by truck. Only Theo H. Davies Ltd. voted to retain the railroad; the rest voted to use the existing highways, despite their poor condition. Hawai‘i Consolidated Railroad then offered its entire right-of-way, including all bridges and tunnels, to the Territorial Highway Department and to the Hawai‘i County supervisors. Both agencies declined the railroad’s offer.

The entire railroad was sold as scrap to Gilmore Steel & Company of San Francisco for \$81,000. About the time the scrappers had finished pulling up the rails and begun dismantling the steel bridges, the Territorial Highway Department changed its mind. They decided to improve the Hawai‘i Belt Road, along the Hāmākua Coast by relocating it to the railroad right-of-way and to utilize the railroad trestles as highway bridge supports. They bought the bridges still in place, as well as the parts of bridges already trucked to Hilo, for \$303,723.53 – nearly four times the amount Gilmore Steel & Supply Company had paid to Hawai‘i Consolidated for the entire railroad. These railroad bridge elements were used for the Hawai‘i Belt Road. . . (MKE Associates LLC and Fung Associates, Inc. 2013:E8)

By 1941, Honomū Sugar Company held 3,027 acres of cane land, and production had reached 10,407 tons (Hitch 1992), but in years following World War II left an indelible mark on the company as it fell under duress due to wage increases and labor scarcity. A pattern of cane field acquisition emerged in the following years in an effort to boost cultivatable acreage and thereby ensure sustainable profitability for the big players in the industry, and in 1946, C. Brewer & Co. acquired a controlling interest in Honomū Sugar Company and merged it into the Pepe‘ekee Sugar Company (Dorrance and Morgan 2000). Nearly two decades later in 1962, Pepe‘ekee Sugar Company fused with Hakalau Plantation, and in 1973 Hakalau consolidated into Mauna Kea Sugar Company, a non-profit corporation that now held Hakalau in addition to the Honomū, Pepe‘ekee, ‘Onomea, and Hilo Sugar companies (Dorrance and Morgan 2000). A 1966 USGS map (Figure 28) shows the route of Hawai‘i Belt Road along the western boundary of the project area and the only remaining plantation infrastructure in the project area is the looping cane road along the southern portion of the project area. Aerial imagery taken in 1965 (Figure 29) shows the majority of the parcel, with the exception of the eastern point, cultivated in cane and a looping cane haul road along the southern portion of the property. Another aerial taken in 1977 (Figure 30) shows ongoing cane cultivation in the project area, however, the looping cane haul road appears to have fallen out of use by this time. Mauna Kea Sugar Company, which eventually became Mauna Kea Agribusiness, became the third-largest in acreage (13,000 acres) on Hawai‘i Island. It continued to operate until 1994 when it phased out sugar production and closed its doors forever, marking the end of commercial sugarcane production in the Hilo area (Dorrance and Morgan 2000).

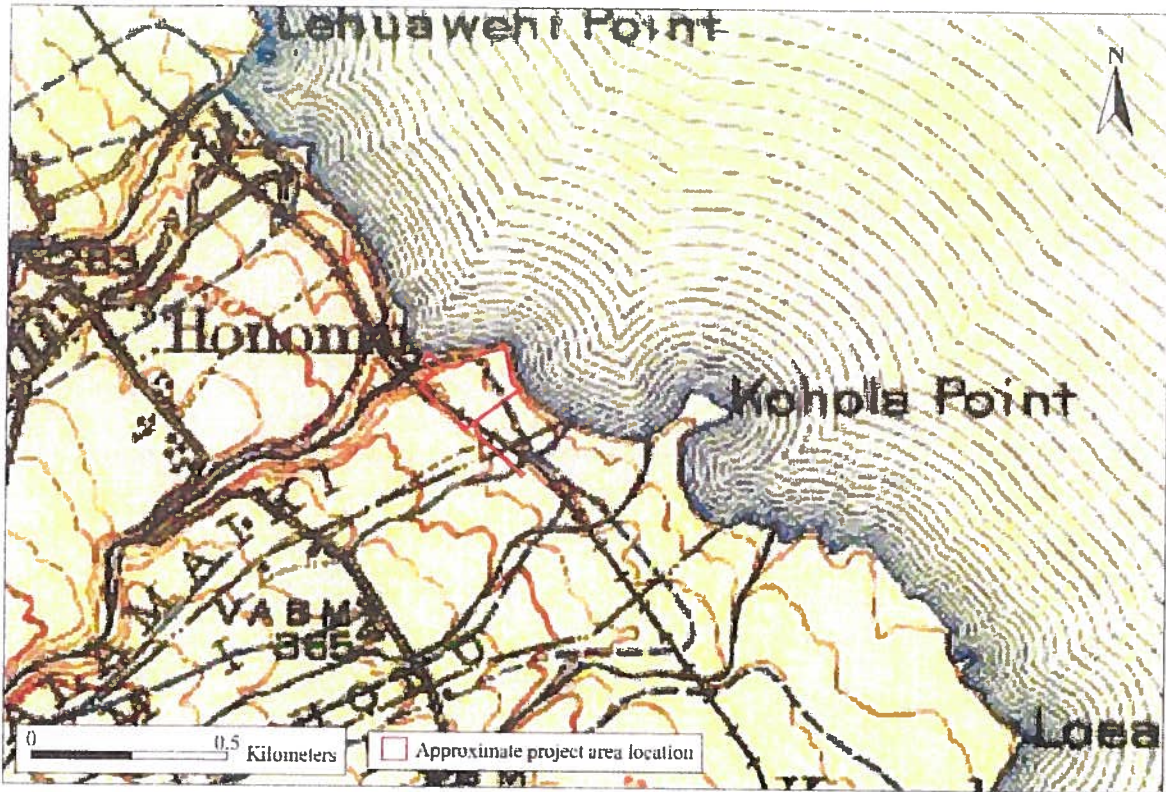


Figure 24. 1915 USGS Honomū Quadrangle map showing railroad and flume in the project area.

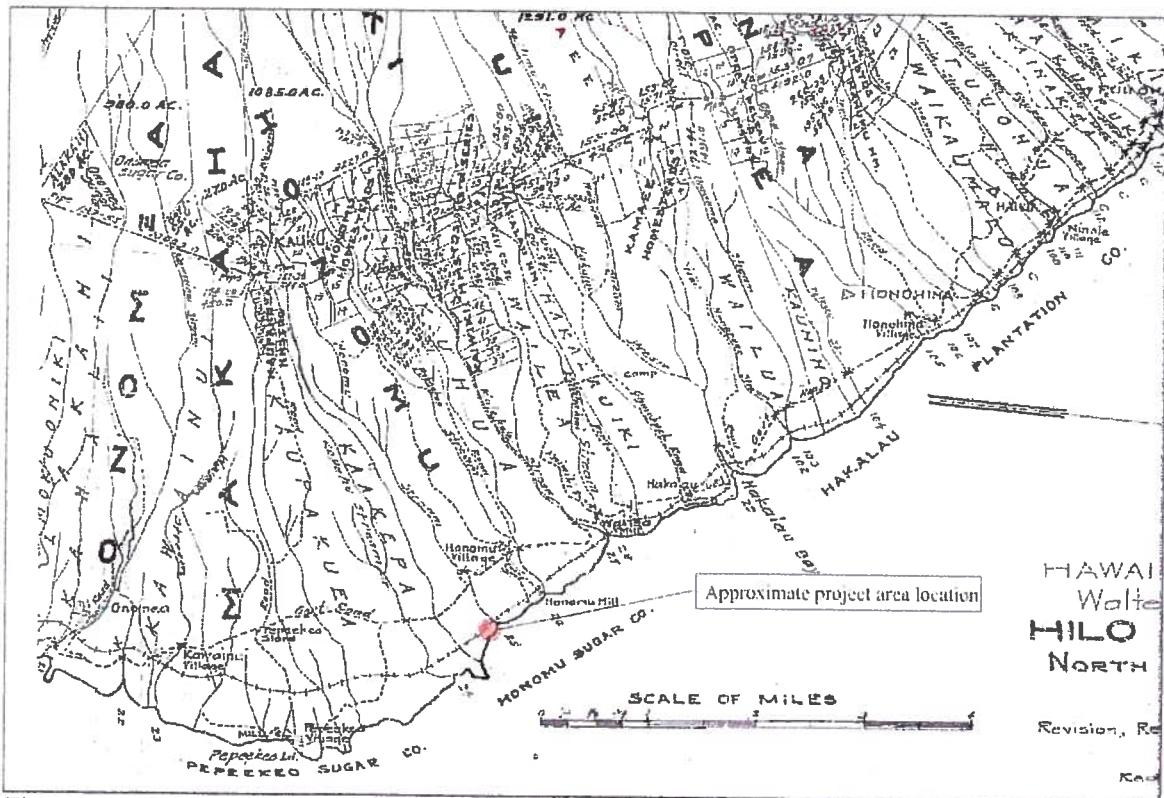


Figure 25. HTS/HSS Plat Map No. 0799 dated 1922 showing the extent of the Honomū Sugar Co. lands.

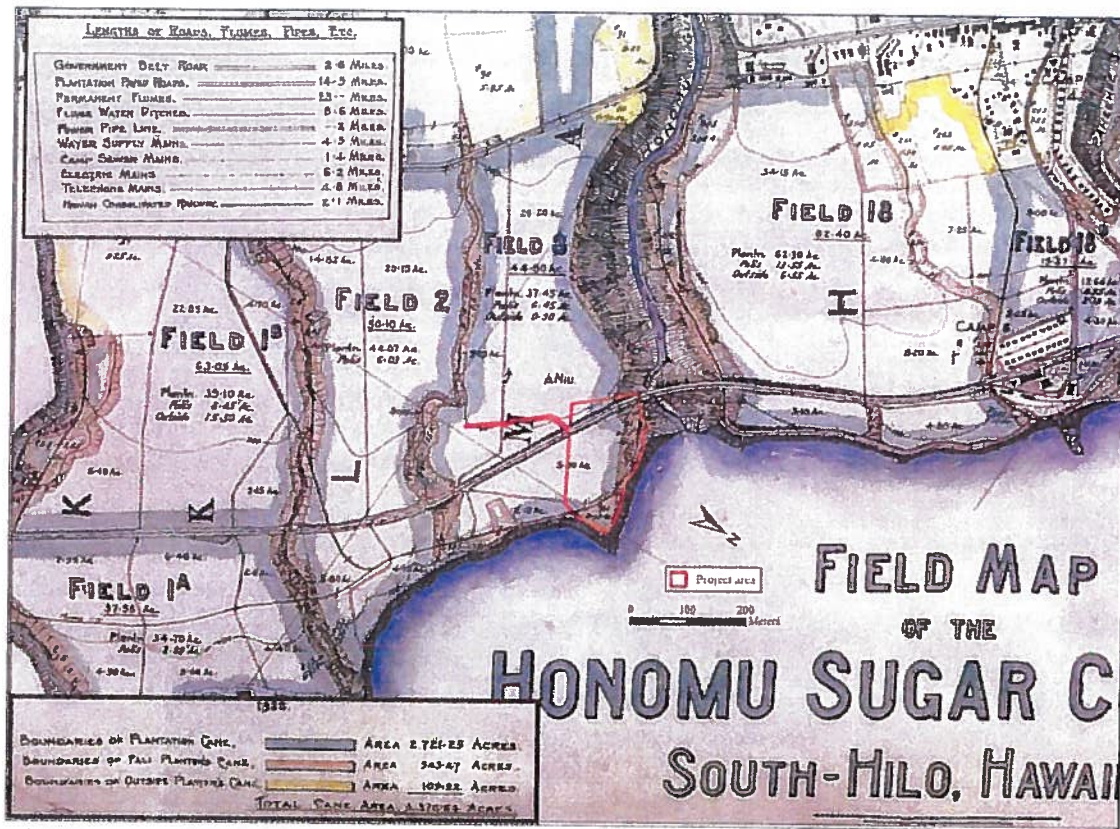


Figure 26. 1932 Field Map of the Honomu Sugar Company by A. J. Williamson. (Edmund Olson Trust Archives)

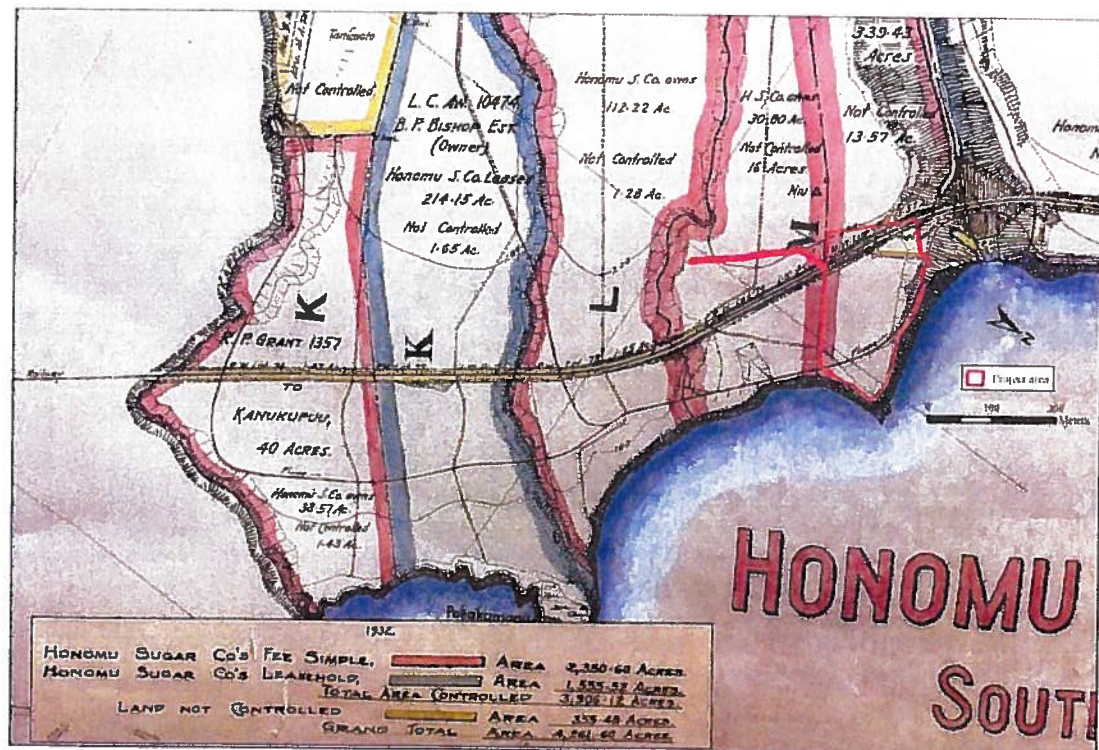


Figure 27. 1932 Title Map of the Honomu Sugar Company by A. J. Williamson. (Edmund Olson Trust Archives).

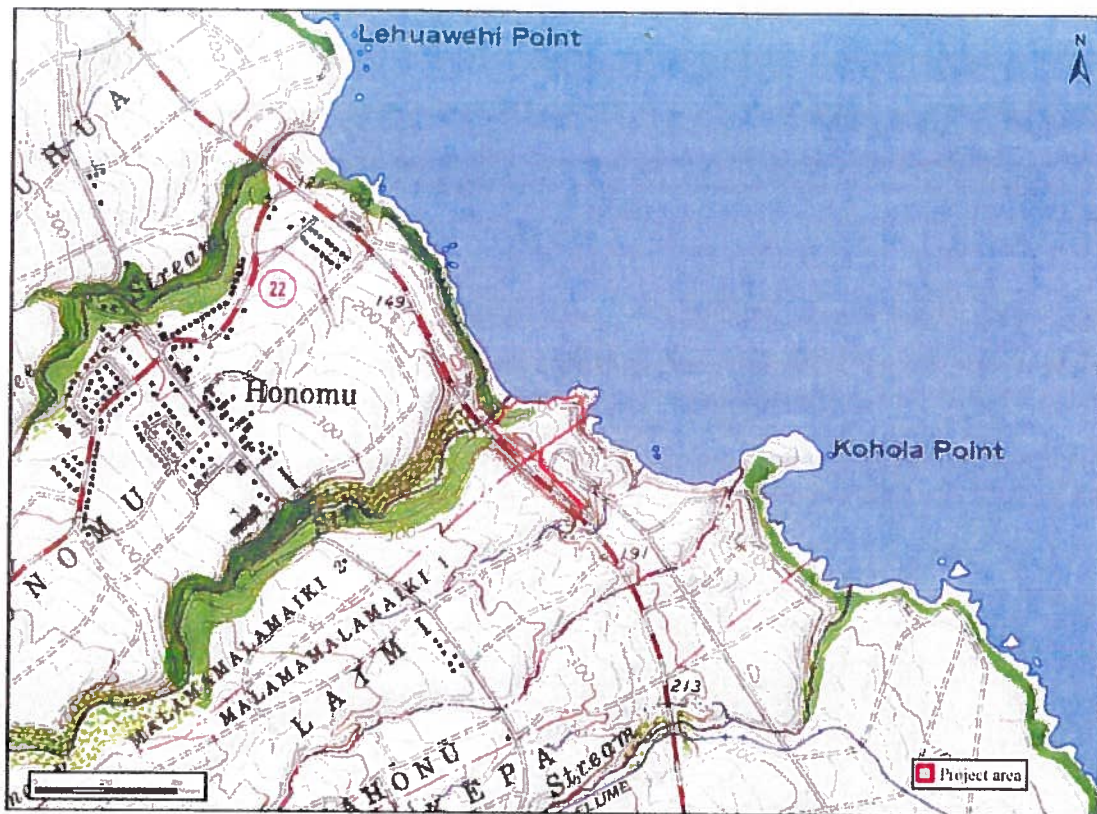


Figure 28. 1966 USGS Pāpa'ikou Quadrangle map showing railroad and cane road in the project area.



Figure 29. 1965 aerial showing parcel cultivated in cane and a cane haul road.



Figure 30. 1977 aerial showing the project area parcel cultivated in cane.

SUMMARY OF PREVIOUS STUDIES

The earliest archaeological work done in East Hawai'i was that of the early twentieth-century *heiau* researchers Thomas G. Thrum and John F. G. Stokes (Stokes and Dye 1991; Thrum 1908). They did not identify any *heiau* in the current study area or within the larger region spanning between Honomū and Hakalau. During the early 1930s, Alfred E. Hudson (Hudson 1932), working under the aegis of the Bernice Pauahi Bishop Museum, conducted archaeological investigations in East Hawai'i. He found little in the region surrounding the current area of study, although he did note the presence of a roughly .25-mile square area of *kalo* terraces north of the project area in the upper part of Hakalau Gulch (Hudson in Maly 1994).

Prior to 2020, there have been no previous archaeological studies conducted specifically within the subject parcel or within the greater Mālamalamaiki 2nd Ahupua'a. However, several previous studies have been conducted in the neighboring *ahupua'a* located to the north including Hakalau (Walker 1994; Rosendahl 2001; Uyeoka 2007; Rosendahl 2009; Henry 2014), Wailea (Desilets et al. 2004; Hammatt and Colin 1998), Kaiwiki 3 (Escott 2011), and Kūhūa-Honomū (Bautista et al. 2018b; Glennon et al. 2019). The archaeological finds from these studies have been limited to Historic era sites most of which were associated with commercial sugar plantation (i.e. concrete foundations, wooden structures, ditches), plantation cemeteries, bridges, and railroad infrastructure. None of these archaeological studies have reported on any Precontact era sites. The cultural impact assessments conducted in the study area vicinity are limited and have focused solely on the lands of Kūhūa-Honomū located north of the project area (Bautista et al. 2018a; Santos et al. 2019). The cultural practices identified in these studies included subsistence gathering in the streams and on the coastline. The parties consulted as part of these studies also expressed concern over the disturbance of historical plantation features as land use activities change in the area.

In 2020, ASM Affiliates conducted an archaeological inventory survey of the project area (Glennon and Brandt 2020). One previously recorded site (State Inventory of Historic Places Site 50-10-26-24212) and one newly identified site (SIHP Site 50-10-26-31238) were documented. Site 24212 is a portion of the Hawai'i Consolidated Railroad railway bed that extends near the western boundary of the parcel. Site 31238 is a section of cut earthen ditch location along the southeastern edge of Mālamalamaiki Gulch near the northern boundary of the project area. Site 31238 is the former location of a permanent flume built by the Honomū Sugar Company.

Site 24212 is considered significant under Criterion a for its association with the development of commercial agriculture (sugarcane) in Hawai'i during the early twentieth century and under Criterion d for the information it has yielded regarding early twentieth century sugarcane transportation infrastructure. Likewise, Site 31238 is considered significant under Criterion a for its association with the development of commercial agriculture (sugarcane) in Hawai'i during the early twentieth century and under Criterion d for information it yielded relative to the history of the development of commercial agriculture in South Hilo District. No additional historic preservation work was recommended for either Site 24212 or Site 31238. Thus, their recommended determination of effect for the project was "no historic properties affected." (Glennon and Brandt 2020).

3. CONSULTATION

Gathering input from community members with genealogical ties and long-standing residency or relationships to the study area is vital to the process of assessing potential cultural impacts to resources, practices, and beliefs. It is precisely these individuals that ascribe meaning and value to traditional resources and practices. Community members often possess traditional knowledge and in-depth understanding that are unavailable elsewhere in the historical or cultural record of a place. As stated in the OEQC (1997) *Guidelines for Assessing Cultural Impacts*, the goal of the oral interview process is to identify potential cultural resources, practices, and beliefs associated with the affected project area. It is the present authors' further contention that the oral interviews should also be used to augment the process of assessing the significance of any identified traditional cultural properties. Thus, it is the researcher's responsibility to use the gathered information to identify and describe potential cultural impacts and propose appropriate mitigation as necessary. This section of the report begins with a description of level of effort undertaken to identify persons believed to have knowledge of the study area, followed by the interview methodology. This section of the report concludes with a presentation of the interview summaries that have been reviewed and approved by the consulted parties.

In an effort to identify individuals knowledgeable about traditional cultural practices and/or uses associated with the current study area, a public notice was submitted to the Office of Hawaiian Affairs (OHA) on August 10, 2020 for publication in their monthly newspaper, *Ka H'ai Ola* (Brandt 2020). The public notice was published in the September edition of *Ka H'ai Ola* and a copy of the public notice is included as Appendix A in this report. As of the date of the current report, no responses have been received from the public notice.

Additionally, ASM staff attempted to contact seven individuals via email and/or phone. These individuals were identified as persons who were long-time residents of the area and believed to have knowledge of past land-use, history, or cultural information. Of the seven people contacted, five agreed to participate in this study. The names of the individuals who agreed to be interviewed are Roger Uchima, Carmelito "Lito" Arkangel, Sam Halsted, Radford DeMotta, and Gail Piliuloha Kailima'i Ka'apuni.

INTERVIEW METHODOLOGY

While interviews for CIAs are typically held in persons and sometimes accompanied by a site visit, in light of the COVID-19 pandemic and state social distancing recommendations, all interviews were conducted via phone. Prior to the interview, ASM staff provided information about the nature and location of the proposed project and informed the potential interviewees about the current study. The potential interviewees were informed that the interviews were completely voluntary and that they would be given an opportunity to review their interview summary prior to inclusion in this report. With their consent, ASM staff then asked questions about their background, their knowledge of past land use, and history of the project area, as well as their knowledge of any past or ongoing cultural practices. The informants were also invited to share their thoughts on the proposed development and offer mitigative solutions. Below are the interview summaries that have been reviewed and approved by the consulted parties.

ROGER UCHIMA

On September 8, 2020, Mr. Roger Uchima contacted ASM staff, Ms. Lokelani Brandt via phone, in response to an August 28, 2020 phone call made by Ms. Brandt regarding the proposed project and the nature of the current study. As a long-time resident of the Honomū area, Mr. Uchima shared that growing up the property was cultivated in cane. He described a loop cane haul road that extended into the property which was built for the cane trucks. He explained that the loop road made it easier for the cane trucks to pick up the cane that was harvested from that area. He shared that once the cane was picked up, it was trucked to the nearby mill.

Mr. Uchima shared that along the easternmost point of the property is a fishing spot that is known by the locals as "Ladders." He related that the name is in reference to the ladders that people used to descend the cliff. He added

that while he remembers the ladders and still fishes along this coastline, he does not access the coast from this property because of safety concerns. When asked if he knew of others who have or continue to access the coast from this property, he shared that he was not aware of any such persons. He went on to state that the only persons who he could recall that used to access the coast from "Ladders" was the older generation. He added that the coastal access from "Ladders" appears to have lessened with the younger generation. Mr. Uchima explained that when the property was cultivated in cane, coastal access was easier because the vegetation on the property and along the cliff was significantly less. He shared that now, the vegetation is dense and makes access difficult.

In describing a past visit to the property, Mr. Uchima shared that he has observed trash piles and noted that people have been illegally dumping rubbish on the property. He opined he was aware of people temporarily camping/squatting on the property. Mr. Uchima stated that with the increase in vegetation, he no longer sees people camping/squatting on the property.

When asked if he was aware of any other cultural practices, history, and past land use, Mr. Uchima stated that aside from prior sugarcane operations and fishing at "Ladders," he was not aware of any other information specific to that property.

CARMELITO ARKANGEL

ASM staff, Ms. Lokelani Brandt contacted Mr. Carmelito "Lito" Arkangel, a long-time Hilo Palikū resident, song writer, musician, and educator regarding the proposed project and current study. When asked if he was familiar with the proposed project area, Mr. Arkangel shared that the area between the old Honomū landing and the former Honomū mill site are known fishing grounds. He related that he used to access the property to fish but no longer does because descending the cliffs via the ladders has become more treacherous. He pointed out that the leaf litter from *hala* trees that grow along the cliff edge makes the area *pakika* (slippery, smooth) and that coastal erosion has made descending the cliff even more dangerous. He related that although the ladders are there, people also have to insert their feet into small holes in the cliff face to climb down. He described the coastal area between Mālamalamaiki and Honomū as "good fishing grounds" and recalled fishing this area on the full-moons. He explained that due to the topography, coastal access in this part of Hilo is limited and shared that he was aware of three coastal access points, one on the current property, another further south near the old Honomū landing, and another further north near the former Honomū mill site. Mr. Arkangel expressed that today, if he wishes to access the coastline to fish whether by himself or with his children, he will usually go through the former Honomū mill site and walk along the coast. When asked if he was aware of others who have or continue to access the area known as "Ladders," Mr. Arkangel shared that yes, people still descend the cliffs from the subject property and added that fishermen may not be there every day, but they do frequent the area.

Mr. Arkangel recalled the many changes to the Hilo Palikū coastline, most notably, the development of private homes and estates along the cliffs. He expressed that before these sorts of development, community members could access the coast without any issue and that over the years it is becoming more challenging for fishers to get to the coast. He commented that fishing in this part of Hilo is already challenging because of the unique topography and many of the old access points have been utilized over the generations. Mr. Arkangel hope the property owner will work collectively with the local fishermen and the County of Hawai'i to ensure coastal access is preserved and that the generations to come can continue the practice of fishing along this coastline.

SAM HALSTED

On September 8, 2020, ASM staff, Ms. Lokelani Brandt conducted a phone interview with Mr. Sam Halsted, an educator, father, hunter, fisherman, and life-long Hilo resident. Born and raised in Waiākea Uka, Hilo, Mr. Halsted relocated to Honomū some twenty-years ago and currently lives there with his wife and family. Mr. Halsted humbly explained that he does not consider himself an expert in the history and practices of this area and pointed out that there are others in the Honomū community that has lived there for many generations and know more about the place. He hopes that what he shared in this interview is not taken as an expert or authoritative opinion rather a sharing of his personal understanding and experiences.

Concerning his background, Mr. Halsted shared that his father relocated to Hawai'i Island in the 1970s and that he had first learned about the various fishing spots between Hilo Bay and Kukuihaele from his uncle, George Martin. He related that his uncle had worked as a mechanic for the Hāmākua Sugar Company and was an avid fisherman. He went on to explain that as he got older and met other fishermen from the area, they would take him to fishing spots previously unknown to him, thus growing his knowledge of the coastal access spots, fishing techniques, and culturally appropriate behavior and practices. For example, he stated that because coastal access is limited along the part of Hilo

and the Hāmākua coast, if they saw a truck parked at one of the access points, they would continue driving to find another unoccupied spot. He opined that it was considered disrespectful to show up and fish right next to another fisher that was already there.

With respect to the current project area vicinity, Mr. Halsted was familiar with the area and stated that the point is a well-known and long-standing fishing spot. He went on to add that in the past, before the installation of the gate, people would drive on the property and descend the cliffs using the ladder and ropes. He laughingly explained that when he was younger, he used to descend the cliffs using ropes and ladders but no longer does this because of safety concerns. He confirmed that people still use this property for coastal access but they now park along the main highway and walking in. He was, however, not sure if people still use the ladders since they are quite old. He related that although he has never gone down the ladders in the project area, he frequently dives in the ocean fronting the point and has observed men picking 'opihi from the rocky shoreline. Mr. Halsted noted that he visits the coastline in the project area for specific types of fish but emphasized that everyone uses resources differently. He clarified that he was aware of only four coastal access routes between the area of Mālamalamaiki and Honomū, which include (from south to north), 23 Flats, the project area, another near the Church, and at the Honomū Mill. He added that each of these spots is quite a distance from one another that if coastal access in the project area is closed, then fishers wishing to get to the point in the project area would have to hike and swim along a very hazardous coastline.

He explained that access to the point in the project area has dwindled over the years but recalled it being a spot that was frequented during his uncle's time (i.e. sugar plantation era). When asked why he believed the use of the project area has decreased over the years, he pointed out that during the plantation era, people from the community were not restricted from accessing the coast. He added that after the plantations closed and the land was sold, landowners installed gates or implemented other measures that prevented people from using the area. Mr. Halsted expressed that he understands why such measures are taken and noted that in the project area, he has observed people illegally camping and littering. He also recalled hearing about a fire sometime in 2019 that occurred on the property, which he believes was started by people illegally camping there.

Mr. Halsted spoke at length about the unique geography of this part of Hilo and the coastal access techniques that developed as a result of the steep landscape. He emphasized that because of the geography, access down the cliff is only achievable at certain locations and that knowledge of these locations and the type of marine resources that can be found at each of these spots is passed down orally between family and friends. He theorized that the fishing spots utilized today, including the one in the project area, were likely used for many generations. He imagined that during the Precontact period, north Hilo was a well-populated area because the land there is suited for agriculture. While the terrain does not allow for more classic Hawaiian fishing practices, such as fishponds, Mr. Halsted contends that the only way to obtain a diversity of marine resources in this part of Hilo, which was integral to the traditional lifestyle, was to descend the cliffs. He emphasized that points and peninsulas have always been the preferred location for fishing because they often extend into deeper parts of the ocean where certain pelagic species frequent such as the prized *ulua*.

In reflecting on the changes in this part of Hilo, Mr. Halsted pointed out that over the years, the fishing practices of this region have continuously been threatened by restricted coastal access. He is disheartened by the fact that over the years, the fishing practices specific to this region have declined. He shared that during the plantation era people often remained in their respective communities for several generations but after the plantations' closed, families and more specifically the younger generation relocated to more affordable parts of the island, such as the Puna District. He believes that the relocation of long-time families contributed to the decline in the traditional fishing practices specific to this region. Mr. Halsted stated that the kids that live here today "are only getting half the picture of what the generations before got." He went on to add that the fishing practices of this region are one cultural element that makes this place unique. He highlighted the fact that people from the area do rely on the natural resources to supplement their households, whether it be for subsistence or monetary purposes. He openly shared that although he is a teacher, he and his family supplement their diet multiple times a week with fish and wild boar that they caught from the area. For these reasons, he believes that maintaining coastal access is critical to the survival of the region's fishing traditions.

When asked if he had any mitigative solutions, Mr. Halsted hopes that the landowner and the local fishermen can work together to develop a mutually beneficial relationship. While he respects private property rights, he hopes a walking path can be established somewhere along the property boundary so that local fishers can continue their practice of accessing the coast and fishing from the point. He is open to meeting and developing a relationship with the landowner and believes that if this can be achieved then this is the true meaning of community.

RADFORD DEMOTTA

At the recommendation of Mr. Sam Halstead, a phone interview was conducted by ASM staff, Ms. Lokelani Brandt on September 14, 2020, with Mr. Radford DeMotta. Raised in Pepe'ekeo, Mr. DeMotta currently resides in Honomū town and is a long-time fisherman. Mr. DeMotta shared that the point in the project area has always been a heavily used fishing spot and recalled people using the area since at least the plantation times. In addition to fishing, he commented that people also access the coast to gather 'opihi and sometimes utilize the nearby stream to collect prawns. He added that fishermen from Hāmākua are the ones that frequent this area. When asked about the ladders in the project area, he stated that the ladders are used by the fishermen to descend the cliff. He pointed out that the ladders were frequently used, however, after the gates were installed fewer people accessed the project area. When asked how people today access the fishing spot, he explained that they park along the road and walk-in.

Mr. DeMotta spoke about the old cane road that extends into the project area and noted that the road was used to connect to the Pepe'ekeo Mill and provided access to the various fishing spots. He pointed out that after the sugar mills closed, the old cane road was no longer maintained and that a bridge along the ocean road had washed out, which cut off access to additional fishing spots. Additionally, he reflected that over the years, after the sugar plantations closed and as homes were built along the coast, access to the old fishing spots were blocked. He shared that this was the case in the area near Pepe'ekeo Mill and that only more recently has fishing access been reestablished. He explained that the Pepe'ekeo Shoreline Fishing Committee of the Pepe'ekeo Community Association currently manages coastal access near the Pepe'ekeo Mill. He specified that they have installed a combination lock and that fishermen wishing to access the area must contact the point person, Jaerick Medeiros-Garcia, and provide specific information before receiving the combination code. Mr. DeMotta noted that managing access is important and that uncontrolled access can have unfortunate consequences. He expressed that in the project area vicinity, there are just a few coastal access points including a place known as 23 Flats, another area just before the gulch, and one in the project area.

When asked if he had any thoughts about how to mitigate shoreline access, Mr. DeMotta believes that a managed public access easement should be established. He maintained that the management system currently used by the Pepe'ekeo Shoreline Fishing Committee is a good model and perhaps the committee could aid with management. Mr. DeMotta would also like to see coastal access maintained so that local fishers can access their traditional fishing spots.

GAIL PILIALOHA KAILIMA'I KA'APUNI

On September 16 and 17, 2020, ASM staff, Ms. Lokelani Brandt conducted a phone interview with Ms. Gail Pilialoha Kailima'i Ka'apuni, a multi-generational resident of Mālamalamaiki. Ms. Ka'apuni's grandfather's sister, Emalia Pilialoha, was married to William Kinney who had purchased the *ahupua'a* of Mālamalamaiki 2nd in 1877. Ms. Ka'apuni's family has maintained their 12-acre family property located on the south side of Honomū Gulch in Mālamalamaiki since her granduncle Kinney had acquired the land. Although Ms. Ka'apuni currently lives in Hilo, she has spent her entire life growing up Mālamalamaiki, where she attended Honomū Elementary School and where her family hunted, fished, and maintained livestock. She is the third of five children. She explained that many people refer to the area as Honomū, however, she recalled her mother telling her that their property was in Mālamalamaiki. In articulating her connection to this area, Ms. Ka'apuni stated that "this place is my breath and this land gives me life."

When asked if she knew any history about her granduncle Kinney, Ms. Ka'apuni explained that he was from Nova Scotia and that he was brought to Hawai'i by King Kalākaua to assist with the king's agricultural endeavors. Ms. Ka'apuni recalled a story of how her granduncle was sent by the king to the Northwestern Hawaiian Islands and saw that the island was filled with bird guano. Her granduncle then recommended to the king that he utilize the guano as fertilizer to advance agricultural productivity. She stated that her granduncle Kinney eventually worked for C. Brewer and Company. Ms. Ka'apuni related that Kinney came to Hawai'i with his wife and children from Nova Scotia but his wife eventually returned home with their children. He, however, remained in Hawai'i and after his wife had died, he remarried Mr. Ka'apuni's grandaunt, Emalia Pilialoha. She shared that Emalia and William had seven children. Although most of Mālamalamaiki was later sold to the Honomū Plantation Company, with respect to the family property, she related that the land belonged to William's children and his sons later passed the property to her grandfather, William Hoapili Kailima'i. She shared that William's sons sold the land to their uncle for "love and a dollar" and explained that this practice continued in the next generation. In further detailing this family tradition, she added that when she recently transferred the property to her eldest son, she "sold it for love and thirty-five dollars" and laughingly explained that the fees to transfer property is much higher today. In reflecting on how her father had acquired the property in Honomū, Ms. Ka'apuni related that they had the option to choose between property in Hilo

or Honomū and that her father insisted they take the Mālamalamaiki property because he would be able to fish and farm. Additionally, she believed that her father knew that the area is a special place to raise a family.

As the family settled into their home in Mālamalamaiki, the land became a vital source of sustenance, and Ms. Ka'apuni shared an array of childhood stories. She commented that at one time, the family house had dirt floors and that when visitors came, they would harvest Guinea grass and use that as floor covering. With respect to the family's use of natural resources, she recalled how her grandparents used to collect 'ōpae (shrimp) and 'o'opu (stream goby) from Honomū Stream. She added that her mother told her that the gulch was called Honomū and that the stream was named Mālamalamaiki. Ms. Ka'apuni described how her grandfather, William H. Kailima'i, had built a small collection/house box for the 'ōpae and that when the weather prevented them from gathering from the stream, he would harvest 'ōpae from the box. She explained that this way, they always had 'ōpae to eat. She reflected on going to *lū'au* (traditional feast) as a child and looking forward to eating 'ōpae. She explained that there were always two pans of 'ōpae at the *lū'au*, one prepared raw-style and one cooked and that "eating it was such a treat." Concerning the family practice of collecting 'o'opu, Ms. Ka'apuni described how her grandfather would collect grass with the roots intact and construct a dam near a waterfall. She clarified that within the grassroots were worm which was a food source for the 'o'opu. She pointed out that the family relied on the river and ocean for various marine resources and noted that while growing up, that is when prawns started populating the rivers. She explained as the prawn population increased, they began eating the food of the 'ōpae, which cause the 'ōpae population to decrease. Furthermore, Ms. Ka'apuni lamented that people today use methods like poison or electrocution to gather prawns which further impacts the streams.

In recalling the family fishing practices, Ms. Ka'apuni remembered the eel fishing method called *puhi 'inikiniki*. Ms. Ka'apuni explained that different communities have their own way of collecting certain resources, but in their family traditions, they would place a piece of bait on a "granny pin," place their hand in a long sock, then hold the baited granny pin in their socked hand. They would then stick their hand with the baited pin into the hole and when the eel swam out into their hand, they would grasp the head and quickly peel the sock from their hand and cover the eel. Once the eel was in the sock, they would strike the tail to kill it. The eel was then prepared and placed into *ti* leaves and they would *lāwalu*, a traditional cooking method where the food is wrapped in *ti* and placed on hot coals. She added that when it was time to eat it, they would grasp the head of the eel and pull the head and central bone out in one sweeping motion. She recalled her brothers and father doing this type of fishing and food preparation but noted that *puhi* (eel) was not something she did not eat. Ms. Ka'apuni added that growing up, these sorts of traditions were not openly shared and that one of the unfortunate results is that these family traditions are forgotten.

Ms. Ka'apuni also shared stories of how her father and brothers would catch *honu* (turtles) between the area of Pepe'ekeo and Hakalau. She described how her father would drop her brothers off in the waters off Pepe'ekeo and they would swim and fish along the coast where they would eventually meet up with their father. She shared that this is how her father trained his sons to become skilled divers and fishermen. Concerning the preparation of *honu*, she stated that they would clean the turtle in the river, where the bridge had collapsed, and that her father and brothers never collected more than two turtles on anyone fishing trip. She remembered how her family would share their catch with 'ohana and neighbors and eating turtle stew, turtle steak, and other turtle dishes as a child. One fishing place that was frequented by her family was Pōhakumana, which is a point on the shore between Kahuā and Honomū. She went to share that today people call that place "23 Flats" but growing up they called it Pōhakumana. She shared stories of how her father would launch their small boat off the cliff by tethering a cable to a tree and boulder. Other resources that were collected by her family included lobsters and Ms. Ka'apuni shared that they ate lobsters quite often and that this is something she no longer enjoys eating.

Ms. Ka'apuni recalled that during the sugar plantation, the family relied on a freshwater spring that was from the Honomū Plantation. She added that towards the end of the plantation, the family was informed that they need to connect to the county water supply. She told of how the family had to maintain their water pipes and recalled the pipes running along the gulch, then across the bridge then up the gulch and to the house just below the cemetery. She described how they often dealt with broken water pipes because when the cane trucks came through it often cause the pipes to come loose. If there was no running water at the house, she shared how she and her siblings would go down to the stream just below the Honomū bridge to bathe. She reminisced about how she would float in the stream and the unique sound that she heard while underwater as cars drove overhead on the bridge. She shared stories of walking down Honomū gulch to the coast to a place they called "Takatoi." She described a small pool at the mouth of the stream where they often swam and played. When asked if this Takatoi was near the project area, she clarified that it is on the north side of the project area. She recalled how her son, who lives in Hilo, would take children to experience Mālamalamaiki and life in the gulch.

She recollected stories of walking the streams and stopping at the various waterfalls where they swam and played. In recalling one particular trip to 'Akaka Falls, Ms. Ka'apuni said that one night she and her father hiked up the narrow path along the river and as they walked, she and her father heard pebbles falling into the water in the gulch. She explained that when they got to the top and after hearing those pebbles, her father immediately told her that they had to turn back and return home. Although her father was adamant about returning home, it was not clear to her why they had to go back. After returning home, she asked her father why they needed to leave and the father told her that the pebbles falling was a sign that they were not alone on their hike and it was not the right time for them to be there. After sharing that account, Ms. Ka'apuni said that recalling that story gave her "chicken skin." In relating another family story associated with 'Akaka Falls, Ms. Ka'apuni spoke about how during her grandparents' generation, they went above falls into the *koa* forest. She detailed how they hewed a *koa* tree down and *kālai wa'a* (carved a canoe) at Kolekole and that after the canoe was prepared the family gathered food and a live pig and paddled to Pohoiki in the Puna District to deliver it to the Issac Hale 'Ohana. She spoke about how her family was close to the Hale 'Ohana and that relationships were maintained between the people of Mālamalamaiki and Pohoiki. In describing other ancient customary practices of this area and those of Hāmākua, Ms. Ka'apuni described how families in 'Onomea cared for the sharks that lived in the bay and made sure they were cleaned and fed. In return, the sharks would offer protection to the families.

When asked about her thoughts on the proposed project, Ms. Ka'apuni described how the land tax has continuously increased due to the type of houses that have been constructed and this has adversely impacted the local and old-time families. She explained that it is important that fishing access is maintained in the project area because people still fish there and stated that "if we don't allow the next generation to do and experience those things and pass it down, it will be lost." Furthermore, she shared that the lifestyle of this area is very much a reflection of past traditions, where some people grow food and others hunt, and that sharing is a lifeway. She spoke passionately about how important this place is to her and her family. She stated that the "love of the 'āina and area is in our blood" and that "Mālamalamaiki to us is really who we are."

4. IDENTIFICATION AND MITIGATION OF POTENTIAL CULTURAL IMPACTS

The OEQC guidelines identify several possible types of cultural practices and beliefs that are subject to assessment. These include "...subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs" (OEQC 1997:1). The guidelines also identify the types of cultural resources, associated with cultural practices and beliefs that are subject to assessment. These include other types of historic properties, both man made and natural, submerged cultural resources, and traditional cultural properties. The origin of the concept and the expanded definition of traditional cultural property is found in National Register Bulletin 38 published by the U.S. Department of Interior-National Park Service (Parker and King 1998). An abbreviated definition is provided below:

"Traditional cultural property" means any historic property associated with the traditional practices and beliefs of an ethnic community or members of that community for more than fifty years. These traditions shall be founded in an ethnic community's history and contribute to maintaining the ethnic community's cultural identity. Traditional associations are those demonstrating a continuity of practice or belief until present or those documented in historical source materials, or both.

"Traditional" as it is used, implies a time depth of at least 50 years, and a generalized mode of transmission of information from one generation to the next, either orally or by act. "Cultural" refers to the beliefs, practices, lifeways, and social institutions of a given community. The use of the term "Property" defines this category of resource as an identifiable place. Traditional cultural properties are not intangible, they must have some kind of boundary; and are subject to the same kind of evaluation as any other historic resource, with one very important exception. By definition, the significance of traditional cultural properties should be determined by the community that values them.

It is however with the definition of "Property" wherein there lies an inherent contradiction, and corresponding difficulty in the process of identification and evaluation of potential Hawaiian traditional cultural properties, because it is precisely the concept of boundaries that runs counter to the traditional Hawaiian belief system. The sacredness of a particular landscape feature is often cosmologically tied to the rest of the landscape as well as to other features on it. To limit a property to a specifically defined area may actually partition it from what makes it significant in the first place. However offensive the concept of boundaries may be, it is nonetheless the regulatory benchmark for defining and assessing traditional cultural properties.

As the OEQC guidelines do not contain criteria for assessing the significance for traditional cultural properties, this study will adopt the state criteria for evaluating the significance of historic properties, of which traditional cultural properties are a subset. To be significant the potential historic property or traditional cultural property must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

- a Be associated with events that have made an important contribution to the broad patterns of our history;
- b Be associated with the lives of persons important in our past;
- c Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
- d Have yielded, or is likely to yield, information important for research on prehistory or history;
- e Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

While it is the practice of the DLNR-SHPD to consider most historic properties significant under Criterion d at a minimum, it is clear that traditional cultural properties by definition would also be significant under Criterion e. A further analytical framework for addressing the preservation and protection of customary and traditional native practices specific to Hawaiian communities resulted from the *Ka Pa'akai O Ka 'Āina* v Land Use Commission court case. The court decision established a three-part process relative to evaluating such potential impacts: first, to identify whether any valued cultural, historical or natural resources are present; and identify the extent to which any traditional and customary native Hawaiian rights are exercised; second, to identify the extent to which those resources and rights

will be affected or impaired; and third, specify any mitigative actions to be taken to reasonably protect native Hawaiian rights if they are found to exist.

SUMMARY OF CULTURE-HISTORICAL BACKGROUND

A review of the culture-historical background material reveals, at a minimum, the Precontact history of Mālamalamaiki Ahupua'a is closely related to that of the greater Hilo Palikū region. The upright cliffs, *kula* regions, and numerous valleys and streams served as an ideal landscape for cultivating traditional crops such as *kalo* (taro), *'uala* (sweet potato), *mai 'a* (banana), and *kō* (sugarcane). Marine and freshwater resources were accessible from the sheltered bays and copious streams. The abundance of resources in this region was both valued and honored as evidenced by the numerous names for specific places, winds, and rains. Although historical sources about Mālamalamaiki are limited, there are numerous other sources that speak of Hilo Palikū and the adjacent *ahupua'a* of Kūhūa, where Kolekole Stream and 'Akaka Falls are located. Both 'Akaka and the broader Hilo Palikū area are commemorated in several traditional *mo'olelo* and historical accounts. More specifically, numerous *mo'olelo*, such as the story of Kuahailo and Hina'aukekele and Ka-Miki, tell of legendary individuals traversing from place to place, meeting with *kama'āina* (long-time residence), and partaking in local events. Similar travel accounts of the Historic period can be found, including the narratives told by Z. Poli and Keliwaiwaiole regarding their journey to 'Akaka Falls. In these traditional and historical narratives, the treacherous passes and turbulent waterways of Hilo Palikū are consistently noted.

During the early part of the 19th-century, as Hawaiian political elites sought ways to modernize the Hawaiian Kingdom and as the population of Western settlers increased, major socioeconomic and political changes began to take place. By 1840, the Hawaiian Kingdom, through the formal adoption of a constitution, became a constitutional monarchy which was soon followed by a reformation of the traditional land tenure system. By 1848, King Kāiulani and his chiefs came together for the final land division and the *ahupua'a* of Mālamalamaiki 2nd was awarded to the *ali'i* Kekuapanio, a *hulumanu* (favorite young noble) of the King. After Kekuapanio died, the land passed to his heir, Huakini. Huakini was, however, involved in a lawsuit against James W. Marsh, Marshall of the Hawaiian Islands, and through a court ruling, Marsh levied Huakini's personal and real property including his land at Mālamalamaiki 2nd. Marsh then sold Mālamalamaiki 2nd at a public auction to Charles C. Harris for \$226 on May 6, 1859. By May of 1875, Harris sold Mālamalamaiki 2nd to Edward Witschy and two years later, Witschy had sold most of the *ahupua'a* to Nova Scotian natives, William and Caroline Kinney. In 1886, Kinney had retained a portion of Mālamalamaiki for his heirs and sold the remaining land to the Honomū Sugar Company, thus expanding commercial sugar cultivation into Mālamalamaiki 2nd.

Throughout the latter half of the 19th century as large tracts of *kula* land were cleared to make way for commercial sugar operations, the natural landscape of Mālamalamaiki was radically transformed, and most of the remnants of the Precontact and Early Historic cultural landscape was destroyed. In Mālamalamaiki 2nd and the greater Hilo Palikū region, sugar cultivation was restricted to the tablelands, thus the gulches and cliffs were spared from the intensive commercial clearing methods. As a result, these marginal areas have maintained some evidence of the pre-plantation natural and cultural landscape that included plants such as *hala*. Within the project area, the Honomū Sugar Company cultivated its cane and processing occurred at the nearby Honomū Mill. As the sugar industry's economic growth hinged upon increased production, thousands of contract laborers arrived in the Hawaiian Islands to work the fields and mills. To house the workforce, plantation owners built homes and small but thriving communities and invested in infrastructure such as flumes to transport cane to the mill. As evidenced in historic maps and the 2020 archaeological inventory survey of the project area, a portion of a former flume route (SIHP Site 50-10-26-31238) was identified in the northeastern section of the property. To further economic prosperity, during the early part of the 20th century, HCR constructed a railroad, a portion of which extended through the project area and documented as SIHP Site 50-10-26-24212. The unfortunate and destructive April 1, 1946 *tsunami*, wiped out many of the bridges and left HCR in economic hardship. Unable to recover, by the 1950s, the railroad tracks were removed and construction on the wider and straighter Māmalahoa Highway was completed providing a quicker route for the cane trucks and motorists. The new highway effectively replaced the old Māmalahoa Road but in that process rerouted motorists to bypass the once thriving plantation communities. Despite having fulfilled their contracts, many of the laborers opted to remain in Hawai'i, which consequently added to the cultural tapestry of the islands and gave rise to Hawai'i's mixed-ethnicity plantation culture. By 1994, commercial sugar operations in this area came to an end, but the hybrid mixed-culture communities that combined elements of Hawaiian and plantation traditions and heritage have persisted.

IDENTIFICATION OF TRADITIONAL AND CUSTOMARY PRACTICES AND PROPOSED MITIGATIVE MEASURES

Historical documentation describing traditional and customary practices are limited, however, the information gathered through the consultation process was crucial in identifying past and ongoing traditional and customary practices specific to the project area. Additionally, the results of the consultation process in addition to the archaeological inventory survey of the project area conducted by ASM Affiliates (Glennon and Brandt 2020, in prep) aided with the identification of Historic era sites.

Concerning past traditional and customary practices, the consulted parties identified the following: the gathering of near-shore marine resources including 'opihi, eels, lobsters, turtle, fishing for near-shore and pelagic species, and gathering of freshwater resources from streams such as 'ōpae, 'o'opu, and prawns. Additionally, several of the consultees identified the tradition of accessing the coast from the cliffs using methods that include ladders, ropes, and knowledge of the natural environment. Regarding the identification of significant historic properties, several of the consulted parties identified the old cane road that looped into the project area. The old cane road easement was also noted in the archaeological inventory survey in addition to a former flume route (Site 31238) and HCR railway bed (Site 24212).

Of the identified traditional and customary practices, many of the consulted parties expressed explicit concern over the potential impact the proposed development could have on coastal access and gathering of near-shore and pelagic marine species. As expressed by the consulted parties, accessing the cliffs to gather marine resources from the eastern point in the project area has been taking place for at least the past five generations, and that this practice has always been a fundamental part of their lifestyle. Mr. DeMotta, Mr. Halsted, and Mr. Arkangel shared that because of the topography, coastal access in the Hilo Palikū area is limited to a few places and that over the years, the number of access points along the coast has decreased. The decrease in coastal access has been attributed to increased coastal residential development that has disregarded customary access rights. In more recent years, efforts to reestablish customary access rights have been achieved through joint partnerships with landowners and community organizations such as the Pepe'ekeo Shoreline Fishing Committee, a subcommittee of the Pepe'ekeo Community Association.

To mitigate any potential adverse impact to this above identified traditional and customary practices, it is recommended that a public access easement be created that extends from the old cane haul road (currently designated by the County of Hawai'i as an easement) to the eastern point in the project area. A public access easement will help ensure that the above-identified practices are maintained for current and future generations. As stated by several of the consulted parties, managed access was preferred. Thus to help with the management of shoreline access, it is recommended that consultation be initiated with Jaerick Medeiros-Garcia of the Pepe'ekeo Shoreline Fishing Committee and any of the parties consulted as part of this study. If the above-identified mitigative measures are considered and implemented then the proposed project may have minimal to no impact on the identified traditional and customary practices. Conversely, if efforts to reasonably protect these traditional customary practices are not considered or implemented, then the proposed project has the potential to disrupt these traditions and practices, thus resulting in an adverse cultural impact.

With respect to the above-identified historic properties, SIHP Site 50-10-26-24212, the HCR railroad bed, was determined significant under Criteria a and d; for its association with the development of commercial agriculture (sugarcane) in Hawai'i during the early twentieth century and for the information it has yielded with respect to early twentieth century sugarcane transportation infrastructure. SIHP Site 50-10-26-31238, the former flume route, was determined significant under Criteria a and d; for its association with the development of commercial agriculture (sugarcane) in Hawai'i during the early twentieth century and for the information yielded relative to the history of the development of commercial agriculture in South Hilo District. The recommended treatment for these sites was "no further work," as they were adequately documented in the AIS (Glennon and Brandt 2020), thus no mitigation would be necessary to address potential impacts to these sites.

In summary, the recommendations provided above are intended to protect the traditional and customary practices that have been occurring on the subject property from being adversely impacted by the proposed residential development. Likewise, these recommendations are to convey to the planner, landowner, and associated government agencies, the concerns and thoughts shared by the parties interviewed as part of this study. If concerted efforts are made to consider and implement the recommended mitigative measures, then the proposed project will likely not result in a significant adverse impact to the above-identified traditional and customary practices.

REFERENCES CITED

- Akana, C. L., and K. Gonzalez.
2015 *Hānau Ka Ua: Hawaiian Rain Names*. Kamehameha Publishing, Honolulu.
- Alexander, W. D.
1890 A Brief History of Land Titles in the Hawaiian Kingdom. In *Hawaiian Almanac and Annual for 1891*. Press Publishing Company, Honolulu.
- Alvarado, G.
2005 Index of Winds by Island. Unpublished manuscript. University of Hawai'i Library.
- Athens, J. S., T. Rieth, and T. S. Dye
2014 A Paleoenvironmental and Archaeological Model-Based Age Estimate for the Colonization of Hawai'i. *American Antiquity* 79(1):144-155.
- Bautista, O., S. Wildey, S. Wilkinson, and H. H. Hammatt
2018a *Cultural Impact Assessment for the Honomū Subsistence Agriculture Community Project, Honomū and Kūhū Ahupua'a, South Hilo District, Hawai'i Island*. Cultural Surveys Hawaii, Inc. Prepared for Townscape.
2018b *Draft Archaeological Literature Review and Field Inspection Report for the Honomū Subsistence Agriculture Community Project, Honomū and Kūhū Ahupua'a, South Hilo District, Hawai'i Island*. Cultural Surveys Hawaii, Inc. Prepared for Townscape.
- Beckwith, M. W.
1932 *Kepelino's Traditions of Hawaii*. Bernice P. Bishop Museum Bulletin 95. Bishop Museum Press, Honolulu.
1951 *The Kumulipo A Hawaiian Creation Chant*. University of Hawaii Press, Honolulu.
- Best, G.
1978 *Railroads of Hawaii: Narrow and Standard Gauge Common Carriers*. Golden West Books, San Marino, CA.
- Bird, I.
1974 *Six Months in the Sandwich Islands*. Charles E. Tuttle Co., Inc., Rutland, Vermont.
- Boundary Commission
1874a Reel #1. Boundary Commission Book Vol. B. Microfilm. Mo'okini Library. University of Hawai'i at Hilo. Hawaiian Reference Collection.
1874b Reels #1 and 2. Boundary Commission Book Vol. D No. 5. Microfilm. Mo'okini Library. University of Hawai'i at Hilo. Hawaiian Reference Collection.
- Brandt, L.
2020 Public Notice. *Ka Wai Ola* [Honolulu]. September 1, 2020: 24. Electronic document, <https://docs.google.com/viewerng/viewer?url=https://kawaiola.news/wp-content/uploads/2020/08/KaWaiOla-Sept-2020.pdf>.
- Buck, E.
1993 *Paradise remade: The politics of culture and history in Hawai'i*. Temple University Press, Philadelphia.
- Buke Māhele
1848 *Buke Kakau Paa no ka mahele aina i Hooholoia iwaena o Kamehameha III a me Na Lii a me Na Konohiki ana*. Hale Alii, Honolulu.
- Cannelora, L.
1974 *The origin of Hawaii land titles and of the rights of native tenants*. Security Title Corp.

References Cited

- Case, E. M. K.
2015 I Kahiki Ke Ola: In Kahiki There is Life Ancestral Memories and Migrations in the New Pacific. Ph.D. Thesis, Victoria University of Wellington, Wellington.
- Chinen, J. J.
1958 *The Great Mahele: Hawaii's Land Division of 1848*. University of Hawaii Press, Honolulu.
1961 *Original Land Titles in Hawaii*. Privately published.
- Coan, T.
1882 *Life in Hawaii: An Autobiographic Sketch of Mission Life and Labors 1835-1881*. Randolph, New York.
- Commissioner of Public Lands (Office of the Commissioner of Public Lands of the Territory of Hawaii)
1929 *Indices of Awards Made by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands*. Star Bulletin Press, Honolulu.
- Cordy, R.
2000 *Exalted Sits the Chief, The Ancient History of Hawai'i Island*. Mutual Publishing, Honolulu.
- Crabbe, K. o., K. Fox, and H. K. Coleman
2017 *Mana Lāhui Kānaka Mai nā kupuna kahiko mai a hiki i kēia wā*. Office of Hawaiian Affairs, Honolulu.
- Desilets, M., A. Kasberg, and R. B. Rechtman
2004 *Archaeological and Limited Cultural Assessment of TMKs: 3-2-9-03: 13, 29, and 60, Wailea Ahupua'a, South Hilo District, Island of Hawai'i*. Rechtman Consulting, LLC Report RC-0247. Prepared for McCully Works, Inc., Hilo, Hawai'i.
- Dorrance, W., and F. Morgan
2000 *Sugar Islands: The 165-Year Story of Sugar in Hawaii*. Mutual Publishing, Honolulu.
- Edith Kanaka'ole Foundation
2012 *Ethnohistorical Study of Honohononui, Hilo, Hawaii Island*. Honohononui Kalaninui'iāmao. Prepared for Kamehameha Schools, Land Assets Division, Honolulu.
- Ellis, W.
1963 *Journal of William Ellis, Narrative of a Tour of Hawaii, or Owhyee; with remarks on the History, Traditions, Manners, Customs and Language of the Inhabitants of the Sandwich Islands*. Advertiser Publishing Co., Ltd., Honolulu.
2004 *Journal of William Ellis, Narrative of a Tour of Hawaii, or Owhyee; with remarks on the History, Traditions, Manners, Customs and Language of the Inhabitants of the Sandwich Islands*. Advertiser Publishing Co., Ltd., Honolulu.
- Else, I.
2004 The Breakdown of the Kapu System and Its Effect on Native Hawaiian Health and Diet. *Hūlili: Multidisciplinary Research on Hawaiian Well-Being* 1(1):241-255.
- Escott, G.
2011 *An Archaeological Assessment of 3.5 Acres Along the Kolekole Stream in Kaiwiki 3 Ahupua'a, South Hilo District, Hawai'i [TMK: (3) 2-9-03:003]*. Scientific Consultant Services, Inc. Prepared for Douglas B. Goehring & Dawn Goehring.
- Fornander, A.
1916-1917 *Fornander Collection of Hawaiian Antiquities and Folk-lore*. Memoirs of the Bernice Pauahi Bishop Museum, vol. IV. Bishop Museum Press, Honolulu.
1969 *An Account of the Polynesian Race: Its Origins and Migrations, and the Ancient History of the Hawaiian People to the Times of Kamehameha I*. Edited by J. F. G. Stokes. Charles Tuttle & Co., Inc., Tokyo.

- Garavoy, J.
2005 "Ua koe ke kuleana o na kanaka" (Reserving the rights of Native Tenants): Integrating Kuleana Rights And Land Trust Priorities in Hawaii. *Harvard Environmental Law* 29:523-571.
- Glennon, G., L. M. U. Kepa'a, and M. R. Clark
2019 *An Archaeological Assessment for the County of Hawai'i's Kolekole Gulch Park Accessibility Improvements Project, TMK: (3) 2-8-015:015, Kuhua Ahupua'a, South Hilo District, Island of Hawai'i*. ASM Affiliates Project Number 31480. Prepared for Geometrician Associates, LLC, Hilo, HI.
- Hammatt, H. H., and B. Colin
1998 *Archaeological Assessment for Seismic Retrofitting for the Kolekole Stream Bridge Wailea, South Hilo District, Hawaii Island*. Prepared for Cultural Surveys Hawaii Prepared For Engineering Concepts, Inc.
- Handy, E. S. C., and E. G. Handy
1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*. Bernice P. Bishop Museum Bulletin 233. Bishop Museum Press. Honolulu.
- Handy, E. S. C., E. G. Handy, and M. K. Pukui
1991 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*. Bernice P. Bishop Museum Bulletin 233. Bishop Museum Press. Honolulu.
- Hommon, R.
1976 The Formation of Primitive States in Pre-Contact Hawaii. Ph.D. Dissertation. University of Arizona. Department of Anthropology. Tucson, AZ.
1986 Social Evolution in Ancient Hawai'i. In *Island Societies: Archaeological Approaches to Evolution and Transformation*, pp. 55-88. edited by P. Kirch. Cambridge University Press, Cambridge, Massachusetts.
- Hudson, A.
1932 *The Archaeology of East Hawaii*. Bernice P Bishop Museum.
- Jokiel, P., K. Rodgers, W. Walsh, D. Polhemus, and T. Wilhelm
2011 Marine Resource Management in the Hawaiian Archipelago: The Traditional Hawaiian System in Relation to the Western Approach. *Journal of Marine Biology* 2011:1-16.
- Kalākaua, L. D.
1888 *The Legends and Myths of Hawaii. The Fables and Folk-Lore of a Strange People*. Charles L. Webster & Company, New York.
- Kamakau, S. M.
1866 Ka moolelo o Kamehameha I: Mokuna III. *Ka Nupepa Kuokoa* [Honolulu]. 22 December: 1. Electronic document. <https://www.papakilodatabase.com>. accessed 08/28/2020.
- Kamakau, S. M.
1976 *The Works of the People of Old, Na Hana a ka Po'e Kahiko*. B.P. Bishop Museum Special Publication 61. Bishop Museum Press. Honolulu.
1992 *Ruling Chiefs of Hawaii*. Revised ed. Kamehameha Schools Press, Honolulu.
- Keliwaiwaiole, J. M.
1885 Ike I na Pali Hookui a Akaka Fall. *Ko Hawaii Pae Aina* [Honolulu]. 5 September: 4. Electronic document, <https://www.papakilodatabase.com>. accessed 08/28/2020.
- Kelly, M.
1956 Changes in Land Tenure in Hawaii, 1778-1850. Manuscript. Hawaiian-Pacific Collection, Master's thesis. University of Hawaii at Manoa. 1956.

References Cited

- Kikiloi, S. K.
2010 *Rebirth of an Archipelago: Sustaining a Hawaiian Cultural Identity for People and Homeland. Hāhili: Multidisciplinary Research on Hawaiian Well-Being* 6:73-115.
- King, R.
n.d. Hawaiian Land Titles. n.d. Electronic document. <https://ags.hawaii.gov/wp-content/uploads>, accessed May 15, 2020.
- Kirch, P. V.
1985 *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory*. University of Hawaii Press, Honolulu.
- 2011 When did the Polynesians Settle Hawai'i? A Review of 150 Years of Scholarly Inquiry and a Tentative Answer. *Hawaiian Archaeology* 12:3-26.
- Kuapuu, S. K.
1861 He wahi Moolelo--Helu 1. *Ka Hae Hawaii* [Honolulu]. 17 April: 12. Electronic document, <https://www.papakilodatabase.com>, accessed 08/28/2020.
- Kuykendall, R.
1938 *The Hawaiian Kingdom 1778–1854. Foundation and Transformation*, vol. 1. 3 vols. University Press of Hawaii, Honolulu.
- Lam, M.
1985 The Imposition of Anglo-American Land Tenure Law On Hawaiians. *Journal of Legal Pluralism and Unofficial Law* 23:104-128.
- Lands, U. S. C. o. P.
1948 *Statehood for Hawaii Hearings Before the Subcommittee on Territories and Insular Affairs of the Committee on Public Lands* U.S. Government Printing Office, Washington.
- Lane, J. C. (editor)
1890 *Directory and Hand-Book of the Kingdom of Hawaii*. The Pacific Press Publishing Company, Oakland, CA.
- Lila, M.
1872 He inoa no Miss Kaiewe. ka Hiapo a B. Kuhea. *Ka Nupepa Kuokoa* [Honolulu]. 17 February: 3. Electronic document. <https://www.papakilodatabase.com>, accessed 08/28/2020.
- Liliuokalani
1978 *An Account of the Creation of the World According to Hawaiian Tradition, Translated from Original Manuscript Preserved Exclusively in Her Majesty's Family*. Pueo Press, Kentfield.
- Lucas, P.
1995 *A Dictionary of Hawaiian Legal Land-Terms*. Native Hawaiian Legal Corporation. University of Hawai'i Committee for the Preservation and Study of Hawaiian Language, Art and Culture, Honolulu.
- Lyman, C.
1925 *Around the Horn to the Sandwich Islands and California, 1845-1850*. Yale University Press, New Haven.
- MacKenzie, M. K.
2015 *Native Hawaiian Law, A Treatise*. Kamehameha Publishing, Honolulu.
- Mahoe, G. K.
1876 Ka Huakaihele ike i na Makaainana o Hilo. *Ka Lahui Hawaii* [Honolulu]. 1876: 1. Electronic document, <https://www.papakilodatabase.com>, accessed August 28, 2020.

- Malo, D.
1903 *Hawaiian Antiquities (Moolelo Hawaii)*. Translated by D. N. B. Emerson. Hawaiian Gazette Co., Ltd., Honolulu.
- 1951 *Hawaiian Antiquities*. Second ed. Translated by N. B. Emerson. B. P. Bishop Museum Special Publication 2. B. P. Bishop Museum Press, Honolulu.
- Maly, K.
1994 Appendix A: Historical Documentary Research. In *Archaeological Inventory Survey, Chin Chuck Road Project Area, Land of Hakalau Nui, South Hilo District, Island of Hawaii (TMK:2-9-02:23 and 2-9-04:56)*. edited by A. Walker and P. H. Rosendahl. Paul H. Rosendahl, Ph.D., Inc. 1563-111194. Prepared for Mr. Eben Dale. C. Brewer Homes, Inc. c/o PBR Hawaii, Hilo, Hawaii.
- 1997 *"Mauna Kea-Kuahikiwi Ku Ha'o I Ka Mālie": A Report on Archival and Historical Documentary Research, Ahupua'a of Humu'ula and Ka'ohē, Districts of Hilo and Hāmākua, Island of Hawai'i*. Kumu Pono Associates, LLC Report HiMK-02d (082796c). Prepared for Native Lands Institute: Research and Policy Analysis. Hilo, HI.
- 2001 *Mālama Pono I Ka 'Āina—An Overview of the Hawaiian Cultural Landscape*. Kumu Pono Associates.
- Maly, K., and O. Maly
2006 *Hilo Palikū - Hilo of the Upright Cliffs: A study of Cultural-Historical Resources of Lands in the Laupāhoehoe Forest Section, Ahupua'a of the Waipunalei-Mauluanui Region, North Hilo District, Island of Hawai'i (TMK Overview Sheet 3-7-01)*. Kumu Pono Associates KPA Study HiHETF116-Laupāhoehoe (120506a). Prepared for United States Department of Agriculture Forest Service - Institute of Pacific Islands Forestry. Hilo.
- McEldowney, H.
1979 *Archaeological and Historical Literature Search and Research Design: Lava Flow Control Study, Hilo, Hawai'i*. Department of Anthropology. B.P. Bishop Museum. Prepared for the U.S. Army Engineer Division, Pacific Ocean.
- Nakaa, G. W.
1893 He moolelo Hawaii: Mokuna II: Ke kumu mua o ko Hawaii nei kanaka. *Ka Nupepa Kuokoa* [Honolulu]. 4 February: 4. Electronic document. <https://www.papakilodatabase.com>. accessed 08/28/2020.
- Nawaa, S. K.
1904 Ma Ka Aoao Ikaika E Ku Ai Kakou. *Ka Nupepa Kuokoa* [Honolulu]. 28 October: 4. accessed 08/28/2020.
- OEQC (Office of Environmental Quality Control)
1997 Guidelines for Assessing Cultural Impacts. as Adopted by the State of Hawaii Environmental Council in 1997 and amended in 2000. Electronic document, http://oeqc2.doh.hawaii.gov/OEOC_Guidance/1997-Cultural-Impacts-Guidance.pdf.
- OHA (Office of Hawaiian Affairs)
2018 Kipuka Database. Electronic document. <http://kipukadatabase.com/kipuka>.
- Oiaio, H.
1900 Pau Ole Kuhihewa Ia Hilo Paliku. *Ka Nupepa Kuokoa* [Honolulu]. 3 August: 2. accessed 08/28/2020.
- Oliveira, K.-A.
2014 *Ancestral Places: Understanding Kanaka Geographies*. Oregon State University Press, Corvallis.
- Parker, P., and T. King
1998 *Guidelines for Evaluating and Documenting Traditional Cultural Properties*. Revised ed. National Register Bulletin 38. U.S. Department of the Interior, National Park Service, Cultural Resources.

References Cited

- PHRI (Paul H. Rosendahl, Ph.D. Inc.)
1991 *Historical Research: Old Government Road, Hawaii Tropical Botanical Garden Project Area, Land of Onomea, South Hilo District, Island of Hawaii (TMK:2-7-10:1,22)*. 1032-061791. Prepared for Ms. Sandra Schutte, Roehrig, Roehrig, Wilson, Hara, Schutte & DeSilva.
- Poepoe, J. M.
1906 Moololo Hawaii Kahiko. *Ka Na'i Aupuni* [Honolulu]. 21 June: 1. Electronic document. <https://www.papakilodatabase.com> accessed 08/28/2020.
- Pogue, J. F.
1978 *Moololo of Ancient Hawaii*. Translated by C. W. Kenn. Topgallant Press. Honolulu.
- Poli, Z.
1867 Ka Hele Malihini ana ia Hawaii a me na Mea Hoi i ike ia. *Ka Nupepa Kuokoa* [Honolulu]. 5 October: 6. Electronic document. <https://www.papakilodatabase.com> accessed 08/28/2020.
- Pukui, M. K. (editor)
1983 *'Ōlelo No 'eau: Hawaiian proverbs & poetical sayings*. Bishop Museum Press. Honolulu.
- Pukui, M. K., and S. H. Elbert
1986 *Hawaiian Dictionary: Hawaiian-English, English-Hawaiian*. Revised and english ed. University of Hawaii Press, Honolulu.
- Pukui, M. K., S. H. Elbert, and E. Mo'okini
1974 *Place Names of Hawaii*. Revised and Expanded ed. University of Hawaii Press, Honolulu.
- Pukui, M. K., E. W. Haertig, and C. A. Lee
1972 *Nānā I Ke Kumu (Look to the Source)*, vol. 1. Hui Hānai. Honolulu.
- Rosendahl, P. H.
1972 Aboriginal Agriculture and Domestic Residence Patterns in Upland Lapakahi. Island of Hawaii. Ph.D. Dissertation. University of Hawaii at Manoa, Department of Anthropology, Honolulu.
- Sai, D. K.
2011 *Ua Mau Ke Ea Sovereignty Endures: An Overview of the Political and Legal History of the Hawaiian Islands*. Pū'ā Foundation, Honolulu.
- Santos, A., L. M. U. Kapa'a, and L. Brandt
2019 *A Cultural Impact Assessment for the County of Hawai'i's Kolekole Gulch Park Accessibility Improvements Project, TMK: (3) 2-8-015:015, Kuhua Ahupua'a, South Hilo District, Island of Hawai'i*. ASM Affiliates Project Number 31480. Prepared for Geometrician Associates, LLC. Hilo, HI.
- Sheldon, H. L.
1882 Reminiscences of Honolulu. *Saturday Day Press* [Honolulu]. 9 December: 1. accessed 08/28/2020.
- Soehren, L.
2005 A Catalog of Hawai'i Place Names Compiled from the Records of the Boundary Commission and the Board of Commissioners to Quiet Land Title of the Kingdom of Hawaii. Part 1: Puna and Hilo. 2005. Electronic document. <http://ulukau.org/cgi-bin/hpn?> accessed September 14, 2016.
- Stokes, J., and T. S. Dye
1991 *Heiau of the Island of Hawai'i: A Historic Survey of Native Hawaiian Temple Sites*. Bishop Museum Bulletin in Anthropology 2. Bishop Museum Press, Honolulu.
- Tatar, E.
1982 *Nineteenth Century Hawaiian Chant*. Pacific Anthropological Records. Prepared for Department of Anthropology, B.P. Bishop Museum.

- Thrum, T.
1908 Tales from the Temples, Part III. In *Hawaiian Almanac and Annual for 1909*, pp. 44-54. edited by T. Thrum. Thos. G. Thrum. Honolulu.
- Thurston, L.
1913 Railroading in Hilo. In *Hawaiian Almanac and Annual for 1914*. edited by T. Thrum. Thos. G. Thrum. Honolulu.
- Wilmshurst, J., T. Hunt, C. Lipo, and A. Anderson
2011 High-Precision Radiocarbon Dating Shows Recent and Rapid Colonization of East Polynesia. *Proceedings of the National Academy of Sciences* 108:1815-1820.

APPENDIX A.
***KA WAIOLA* PUBLIC NOTICE**



**CULTURAL IMPACT
ASSESSMENT -
MĀLAMALAMAĪKI
AHUPUA'A,
SOUTH HILO DISTRICT,
ISLAND OF HAWAII**

ASM Affiliates is preparing a Cultural Impact Assessment (CIA) for a single-family residence being proposed for a roughly 6.48-acre parcel (TMK: (3) 2-5-012-028) situated in Mālamalamaiki Ahupua'a (located south of Hōnōmū Ahupua'a), South Hilo District, Island of Hawai'i. Please contact ASM Affiliates if you would like to participate or contribute to this study by sharing your mana'o about any cultural or historical resources or other information you believe may be relevant. This includes, but not limited to, knowledge of past land use, history, traditional cultural uses of the proposed project area; or those who are involved in any ongoing cultural practices that may be occurring on or in the general vicinity of the subject property. If you have and can share any such information please contact Lokelani Brandt (lbrandt@asmaffiliates.com); phone (808) 969-6066, mailing address ASM Affiliates 507-A E. Lanikaula Street, Hilo, HI 96720. Mahalo.

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From: Talon, Fred A <fred.a.talon@hawaii.gov>
Sent: Friday, October 9, 2020 10:32 AM
To: Orodener, Daniel E
Cc: Jason K. Knable
Subject: No LUC Group Meeting Today? Regarding Holcomb Inquiry...
Attachments: 328012028_jason_kanebu_carlsmith_ball_07282020_inquiry_portion_slud_papaikou_quadrangle.pdf

As you are aware, we are not working in our office and researching inquiries are challenging. This is the first I have seen Mr. Knable's formal request letter. I did receive an email from Mr. Knable yesterday.

I needed more information for subject property in order to properly assess locations of State Land Use (SLU) District Boundaries.

A former railroad-right-of-way crosses the property and on the makai side of the railroad-right-of-way is the location of the SLU Agricultural/Conservation District Boundary. This location depicts most of the property within SLU Conservation. The little area mauka of the railroad-right-of-way and the railroad-right-of-way is within the SLU Agricultural District.

A portion of the State Land Use H-65, Papaikou Quadrangle is attached for your reference.

We shall require a valid survey with the metes and bounds of the subject property and the railroad-right-of-way also in metes and bounds.

I am including Mr. Knable in this email to alert / informing him that we shall require a valid survey map as described above to move forward. If at any time a question or further assistance is needed do not hesitate and email or call at fred.a.talon@hawaii.gov or 808.587.3822.

Mahalo,
Fred Talon
Land Use Commission
Department of Business Economic Development and Tourism
P. O. Box 2359
Honolulu, Hawaii 96804-2359
E-Mail: Fred.a.talon@hawaii.gov
Website: luc.hawaii.gov

PARAKON QUADRANGLE
HAWAII ISLANDS AND COUNTY OF HAWAII
7.5 MINUTE SERIES (CONTINUATION)

Holcomb Property
TMK: (3) 2-8-012:028

SECURITY ASSIGNMENTS	
LEADSET NO.	DATE
ATC-338 U & A	JAN 15, 1973
ATC-340 U & A	JAN 15, 1973
ATC-341 A & U	JAN 15, 1973
ATC-342 A & U	FEB 15, 1973
ATC-355 AIC & U	MAY 16, 1974
SLU 87-8 A & U	JUL 23, 1968
SLU 88-8 AIC & U	MAY 21, 1968
ATC-326	M-U 5/21/68

548 (100)

[illegible]

THE U.S. DEPARTMENT OF JUSTICE, OFFICE OF THE ATTORNEY GENERAL

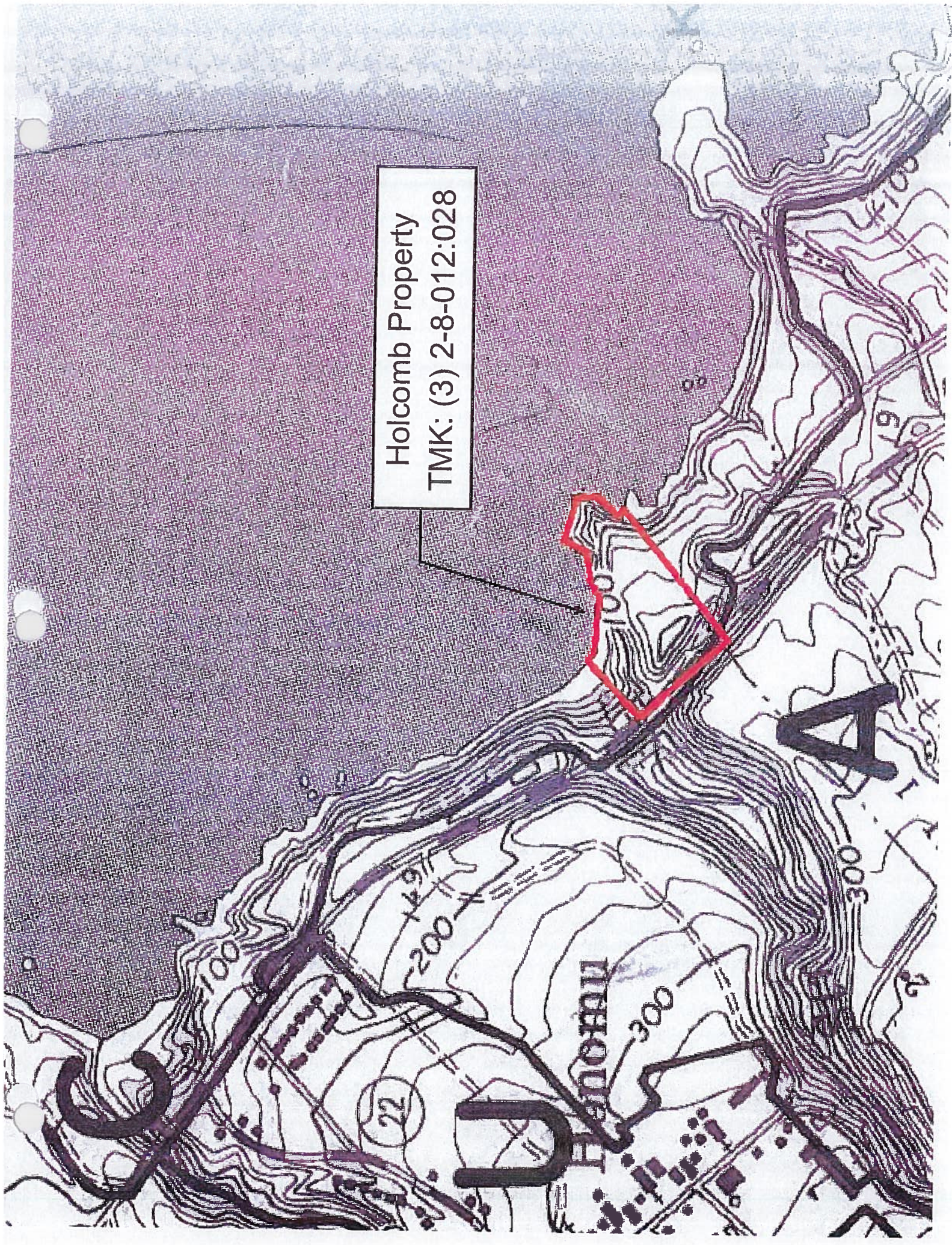
Reserve of _____ Light Duty
Unapproved Sick _____
(State Paid)

PAPAHUOKE, HAWAII
 1st through 4th Grades
 1946-1950

H-65

EXHIBIT N

Holcomb Property
TMK: (3) 2-8-012:028



Visual Impact Assessment
Holcomb Residence in Special Management Area
TMK (3) 2-8-012:028, South Hilo District, Island of Hawai'i

By Ron Terry, Ph.D.
Geometrician Associates, LLC
October 2020

Introduction

This assessment concerns a development of a single-family residence on a shoreline property. The 6.485-acre property identified by TMK 2-8-012:028 is located near the town of Honomū, directly adjacent to State Highway 19, on the Island of Hawai'i, as shown on Figure 1. Almost the entire property was formerly cultivated in sugar cane but is now covered in tall non-native trees except for the center, which supports a few clumps of trees scattered in meadows of tall, robust grasses (Figure 2). Native hala trees, all of which are being preserved, fringe the top of the shoreline cliff where not crowded out by invasive ironwood trees.

Construction of the home requires a Special Management Area Use Permit from the County of Hawai'i. Granting of the permit is subject to Rule 9 of Hawai'i County Planning Commission Rules, which govern County-regulated development in the Special Management Area or SMA of the Coastal Zone in the County of Hawai'i. Chapter 205A, Hawai'i Revised Statutes, expresses the intent of the State's Coastal Zone Management program to protect, preserve, and where desirable, restore or improve the quality of scenic and open space resources.

To implement this intent, the guidelines contained in Rule 9 seek to minimize development that would **substantially interfere with or detract from the line of sight toward the sea from the State Highway nearest the coast or from other scenic areas identified in the General Plan**. The discussion below identifies and evaluates scenic resources in the context of these regulations and guidelines.

Several locations in Rural South Hilo and North Hilo offer drivers on Highway 19 fairly long, sweeping, horizon views of the sea. Because of the ever-present sea-cliffs, actual shoreline views are rare and found mainly at lookouts in Wainaku and Laupahoehoe and on some of the bridges. The Holcomb property is at about Mile Marker (MM) 12.7. On the highway approaching the property between MM 12.5 and MM 14 there are no sweeping views, as the combination of topography, distance and vegetation allow drivers only fleeting views of the sea. The shoreline itself is not visible between Honoli'i Gulch and Kolekole Gulch, at MM 14.2.

Although the Holcomb property borders State Highway 19, the useable portion of the property is set behind a tall road-cut through which the highway passes (Figures 2a and b). On the highway fronting the Holcomb property itself there are no ocean views on the

approaches from the south or north. The view of the property approaching on the highway from the north includes the trees situated at the top of cliff on the wide highway right-of-way in this area and a narrow view of similar trees on the far western cliff of the Holcomb property (Figure 2c). The view of the property approaching on the highway from the south is almost completely blocked by trees and topography (Figure 2d). The site chosen for the home is within a grassy part of the property in the interior (Figure 2e) and is not visible from any point on the highway. Tall trees present on all margins of the property block views of the interior from all directions, obscuring even views of the horizon (Figures 2a and 2f).

The Hawai'i County General Plan states:

The natural beauty of the South Hilo district is dominated by Mauna Kea and Mauna Loa. From various locations in the area, there are magnificent views of the mountains. Hilo Bay provides a picturesque front yard for Hilo. From the bay the land gently slopes upward towards Mauna Kea and Mauna Loa. Throughout the district there are waterfalls, including the famous Akaka Falls and nearby Kahuna Falls, Rainbow Falls, and others (p. 7-5).

The General Plan identifies areas of natural beauty and important viewplanes for various places in Hawai'i County (Table 1). None of these sites are visible from the project site or located within a mile of it.

Table 1
County General Plan Sites of Natural Beauty in Rural South Hilo

Site	Tax Map Key Plats	Ahupua'a or Region
Honolii Beach Area and Stream	2-6-24:1-4	Alae
Onomea Bay Area	2-7-09:1, 2, 26; 2-7-10:1	Kahalii-Onomea
Onomea Arch (fallen)	2-7-10:1	Onomea
Akaka and Kahuna Falls	2-8-10:34	Honomu
Kolekole Gulch	2-8-15, 2-9-03	Kuhua-Kaiwiki
Hakalau Bay/Gulch Area	2-9-02, 3-1-01	Hakalaunui-Kamae

The Hamakua Community Development Plan (CDP) implements the General Plan for the region including the districts of Hamakua, North Hilo and the Rural South Hilo portion of the South Hilo District, which is north of the Wailuku River. Protection of scenic views is an integral part of the CDP, which includes the following objectives and policies:

Community Objective

Objective 1: Protect, restore, and enhance watershed ecosystems, sweeping views, and open spaces from mauka forests to makai shorelines, while assuring responsible public access for recreational, spiritual, cultural, and sustenance practices.

Objective 2: Protect and restore viable agricultural lands and resources. Protect and enhance viewscapes and open spaces that exemplify Hamakua's rural character.

4. 5. 2 Existing Policy

Land Use Policy Intent: Do not allow incompatible construction in areas of natural beauty. (GP 7.3 (i))

Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources. (GP 7.2 a))

Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty. (GP 7.2 (c))

Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas. GP 8.2 (e))

Provide and protect open space for the social, environmental, and economic well-being of the County of Hawaii and its residents. (GP 14.8.2 a))

In order to assess the potential for interference by the home (the only planned structure) with views from State Highway 19 and the nearby shoreline, a series of roughly mauka-makai profiles were developed. These are based on Google Earth © imagery and digital elevation models (DEMs). These DEMs are derived from Shuttle Radar Topography Mission (SRTM) collected in 2009 from the Space Shuttle Endeavour. The inherent accuracy ranges from 5 to 10 meters but is improved by applying interpolation algorithms to mix and mesh SRTM data with other DEM data such as U.S. Geological Survey models. The resulting DEM has a smoothed surface and provides a reasonably accurate first-order approximation of topography. The profiles also include the existing topography, the proposed 18-foot from finished grade home, and a small but representative and conservatively depicted sample of the trees. Figures 3a-f illustrate various angles for potential viewers and include *sight lines* between critical points, including the highway, the top of the roof, and points along the shoreline. The profiles demonstrate the following:

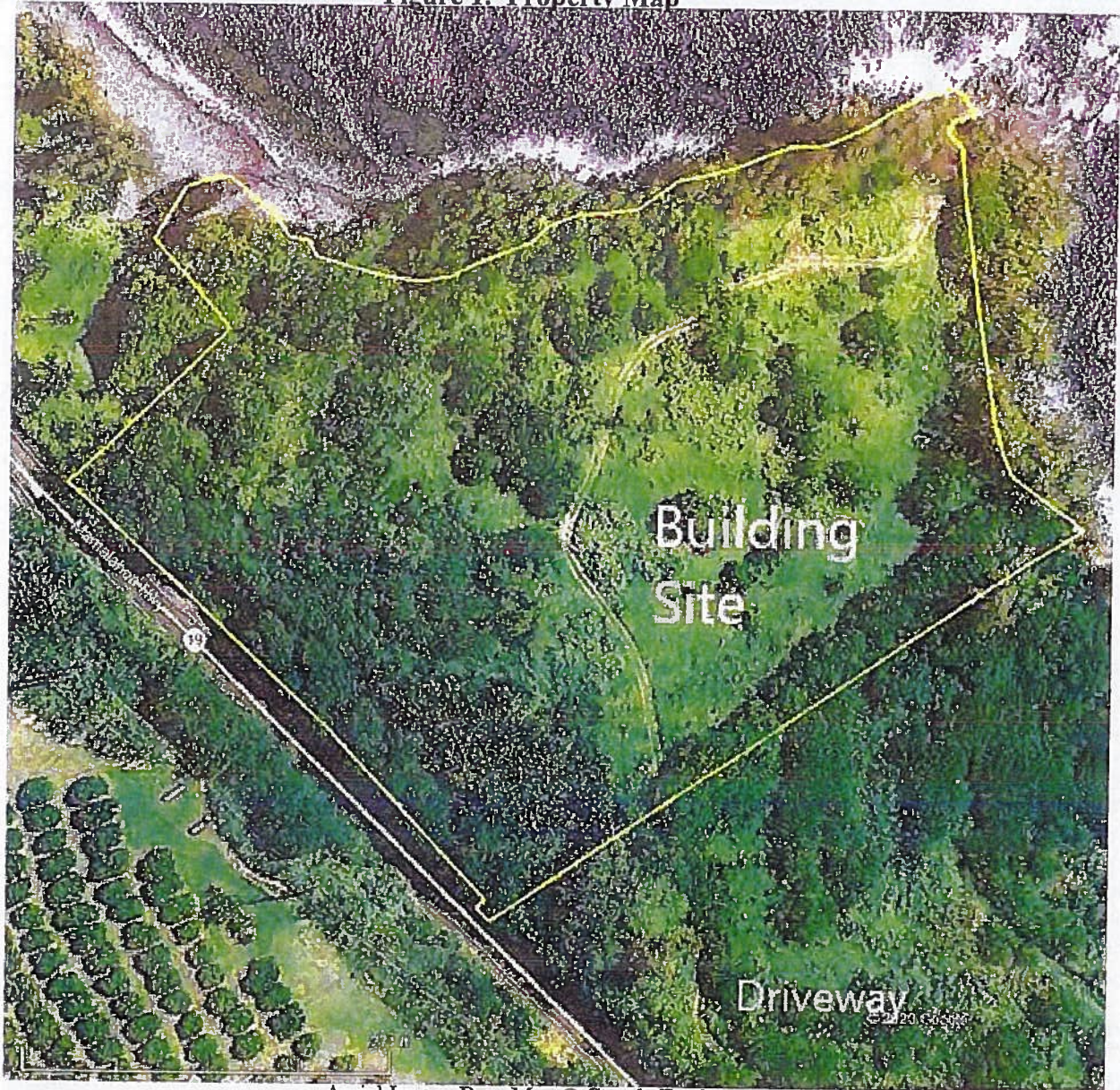
- Views from the shoreline to the home. As illustrated in three profiles to various shoreline points, owing to the steep cliff that fronts the entire coastline, and secondarily because of the fringe of trees, the home will not be visible at all from any shoreline areas within miles of property. Even if invasive trees are cleared from a planned area in the north and northeast of the property, no shoreline views would be possible.
- Views from Highway 19 to the home. As illustrated in three profiles to various points on the highway, the home location lies in a topographic "dip" situated below a steep slope, which would conceal it from view from the *mauka* side, even without vegetation. No visual impact for the viewplanes from the highway to towards the shoreline and over the home is expected.

In summary, construction of the residence would not lead to any visual impacts for the general public. Views to and from the shoreline and Highway 19 would not be affected.

The project is being designed to conform with the Conservation District rules (Hawai'i Administrative Rules 13-5), which require subtle and sensitive colors and architectural styles, minimal height, and landscaping utilizing almost exclusively native and Polynesian species. Although the home will not be visible to the general public except from the air or out to sea, its sensitive design will not cause any scenic impacts. Invasive

ironwood tree removal to establish a sight line towards the sea on the north/northeast – coupled with planting native hala trees – would be undertaken, but this will not adversely affect any views of the property from the shoreline or highway. To the degree there are any visual effects from this tree removal, the replacement of ironwood with hala will be positive.

Figure 1. Property Map



Aerial Image Base Map © Google Earth

Figure 2. Property Photos

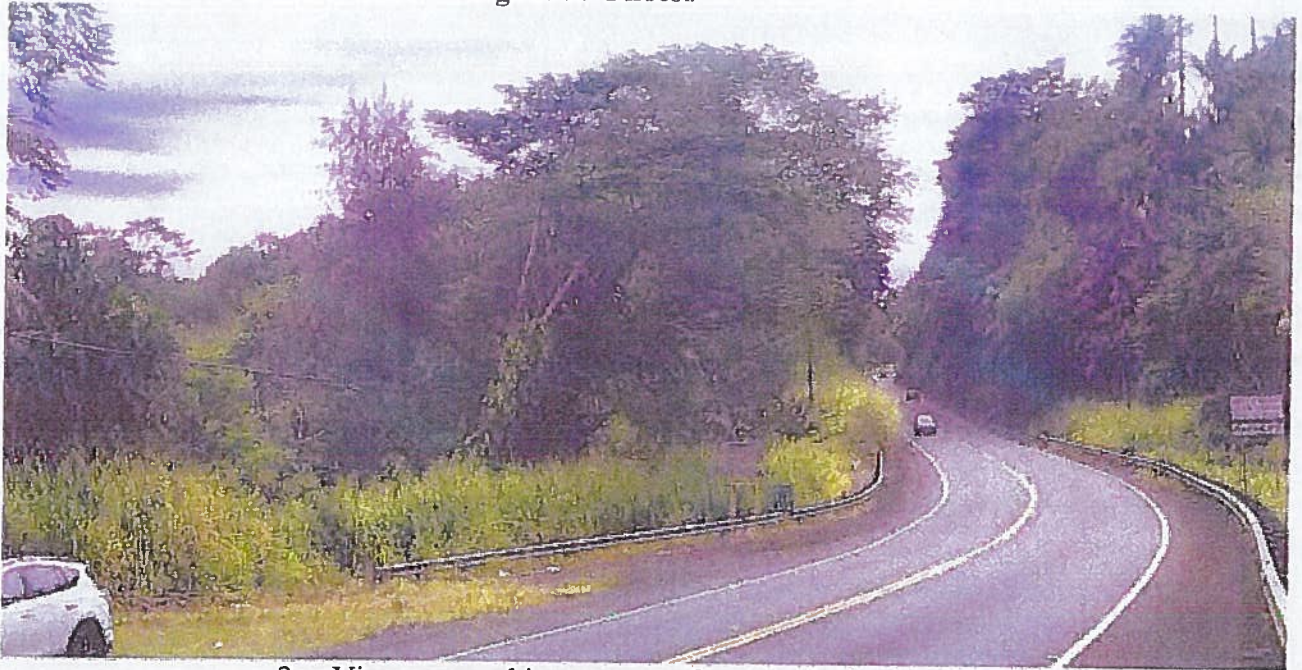


2a. Oblique aerial. Note highway on left and right, with roadcut in between. Home site is grassy area in middle of point. ▲

▼ 2b. Road cut that borders property on southwest side.



Figure 2. Photos



2c. View approaching property from north ▲

▼ 2d. View approaching property from south



Figure 2. Photos



2e. ▲ Building site

▼ 2f. View from building site north towards sea

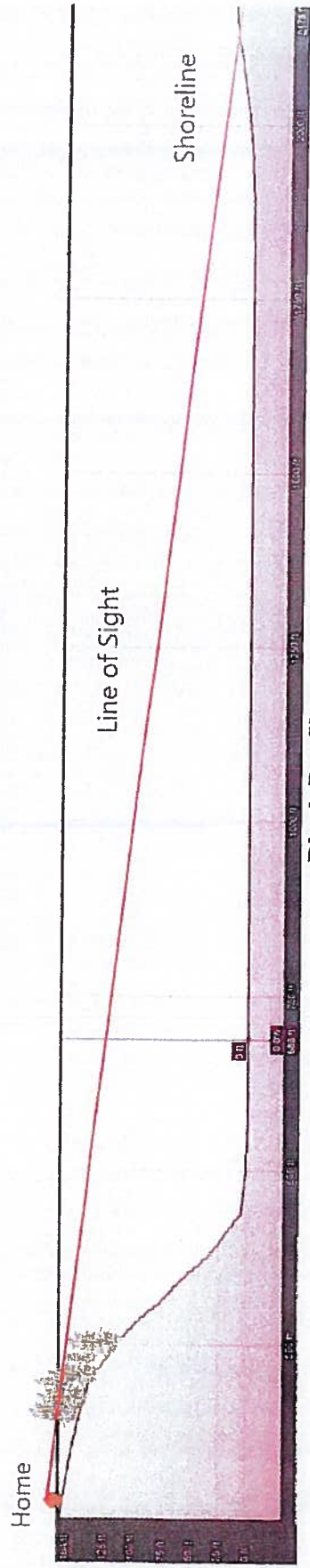


Figure 3 Visual Impact Profiles

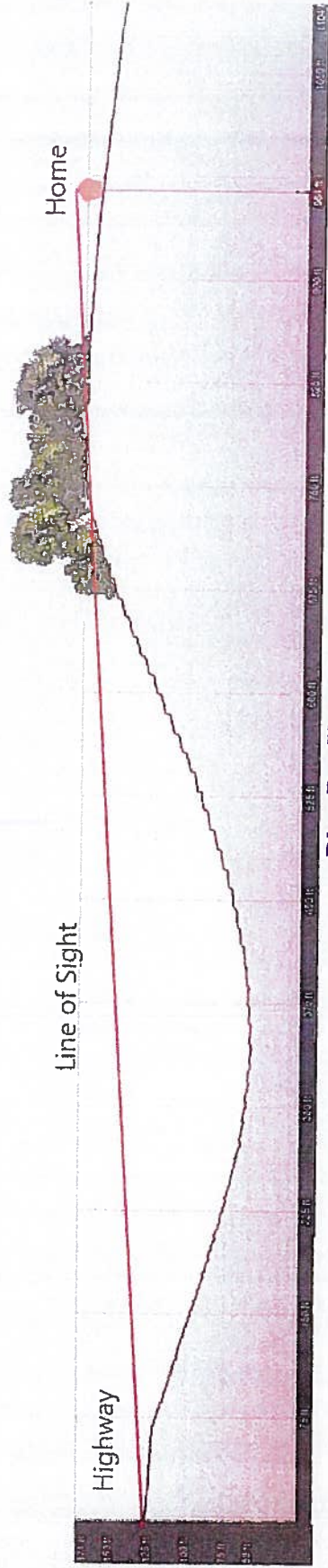


Key to Profiles

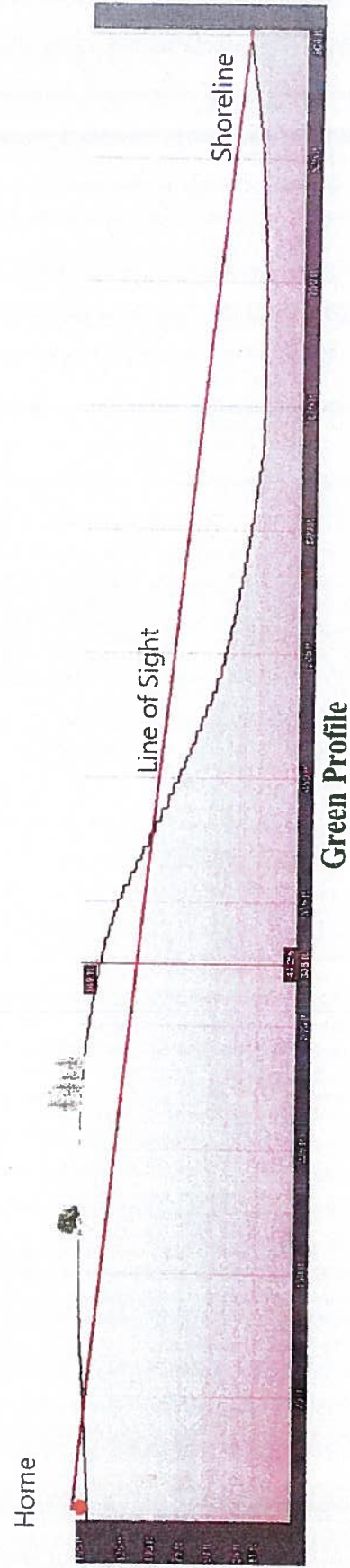
Figure 3 Visual Impact Profiles



Black Profile



Blue Profile



Green Profile

Figure 3 Visual Impact Profiles

